THE

SCIENTIFIC AND LITERARY REVIEW,

AND RECORD OF PROGRESS IN ARTS, INDUSTRY, AND MANUFACTURES,

INCORPORATING THE

Journal of the Inventors' Institute.

REGISTERED FOR TRANSMISSION ABROAD.]

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⁂ *Communications to the Editor to be addressed to him at* 21, *Cockspur Street.*

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THE INVENTORS' INSTITUTE,

4, ST. MARTIN'S PLACE, TRAFALGAR SQUARE.

Chairman of the Council—**SIR ANTONIO BRADY.**

THE various efforts which have been made, and the numerous influences now at work to injure, if not to destroy, Patent Rights; the inefficiency of the many well intended, but ill considered, schemes of Patent Law Reform which have from time to time been suggested, and the tendency of which has generally been to prejudice the Inventor, without advantage to the Public; together with the proceedings so essentially involving the interests of inventors which have already taken place in Parliament, show the necessity of an immediate and active co-operation on the part of those interested in Inventions and in Patent Property, and that an Association for the Protection and Defence of Patent Rights is urgently needed. This Institute has, therefore, been established for the purpose of uniting and organizing the influence of Inventors, Patentees and others. Its objects are:—

1st. To protect Inventors' interests and defend the privilege of obtaining her Majesty's Letters Patent.

2nd. To promote improvements in the Patent Laws.

3rd. To facilitate the diffusion of information with reference to Inventions and other subjects beneficial to Inventors and Patentees.

The qualification for Annual Members of the Institute is a yearly Subscription of One Guinea, and for Life Members a single payment of Ten Guineas.

Persons desirous of becoming members are requested to forward their names and addresses to the Secretary.

THE
INVENTORS' PATENT-RIGHT ASSOCIATION,
LIMITED,
21, Cockspur-street, Charing-cross, London, S.W.

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To Sell and License Patented Inventions.
To form Public Companies, or otherwise arrange for the Public Introduction of Patented Inventions.
To furnish advice and Professional Assistance in developing Inventions.
To collect Evidence, arrange Arbitrations, and otherwise ssis tInventors in maintaining their rights.
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THOMAS MORGAN,
Secretary.

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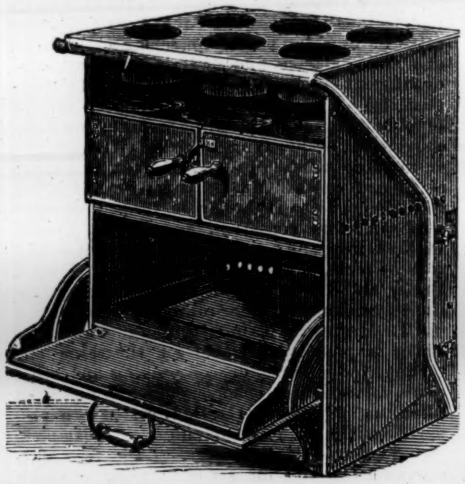

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Where Mr. SOUTHBY can be consulted by appointment.

APPLICATIONS FOR LETTERS PATENT.

⁂ In this list (Com.) means Invention communicated from abroad.

Further information, as to the progress of these Patents by Notice to Proceed, Sealing, and Specifying, can be obtained at the Office, 21, Cockspur-street, Charing Cross.

On March 17th.—942 to 954.—J. B. Alliott. Construction and arrangement of engines.—G. Fowler. Tipping coal.—W. H. Northcott. Steam-engines.—C. Bennett. Protecting scarf pins and other articles.—W. J. Warner. Gas meters.—W. H. Stephens. Meal for fattening pigs, sheep, cattle, and horses.—T. Hydes and J. E. Bennett. Setting steam boilers.—R. George. Taps, valves, and stopcocks.—G. Dixon. Apparatus for preparing rope yarns.—J. Harper. Steam and air engines. (Complete specification.)—A. M. Clark. Signal hand lantern (com.) (Complete specification.)—A. M. Clark. Clothes hook (com.)—A. M. Clark. Electric telegraphy (com.)

On March 18th.—955 to 962.—H. Barrett. Spring brooch back.—F. Lürmann. Brickmaking machines.—P. P. F. Micheá. Tannin.—J. Bailey. Working and locking points on railways.—C. Rutulini. Opening letters and other papers.—B. Wood. Cases or boxes, and arrangements of flaps or leaves thereon or thereto, for exposing advertisement.—C. Carobbi and G. Bellini. Locomotive and other motive-power engines.—W. R. Lake. Fire-escape (com.)

On March 19th.—963 to 979.—W. K. Brock. Billiard table.—E. F. Kingsley. Telegraph (com.)—F. Lebacq. Sardine boxes, without solder.—J. H. Carruthers and D. Rankine. Tramways.—J. Tangye. Raising or lifting the permanent way of railways.—W. R. Lake. Thrust-bearing for screw-propeller shafts (com.)—J. Evans. Anvils.—P. Liddicott. Plate warmer.—A. Barff and J. Kidd. Drying, charring, granulating, compressing, and burning peat.—J. B. Mirrlees. Pumping engine (partly com.)—W. Carnduff and G. McHarg. Cigars and cigarettes.—P. W. Willans. Steam engines.—A. M. Clark. Manufacture of chains and apparatus for the same (com.)—E. Marriott. Artificial fuel (com.)—T. Moy. Rings applicable to pistons and valves.—W. R. Lake. Devices for carrying metallic cartridges for breech-loading firearms (com.)—W. E. Prall. Apparatus for utilizing compressed air in the management of railways.

On March 20th.—980 to 990.—B. F. Stevens. Castors (com.)—J. Imray. Apparatus for working punkahs.—P. Lawrence. Mode or means of and apparatus for extinguishing fires in ships, houses, and other structures.—J. Tugwood. Railway keys and the cement employed thereto, which is applicable to similar or other purposes.—E. Heywood. Self-acting temples for looms.—J. J. Coleman. Preparation of fibres for spinning and weaving operations.—J. Burden. Steam gauges, pressure gauges, and vacuum gauges.—A. Thuillard. New system of horse-shoeing.—R. M. Caffall. Construction of portable and other commodes.—J. D. Kerr. Self-trimming apparatus adapted for loading vessels with coal, broken stones, grain, or other freight.—A. M. Clark. Mills for grinding coffee and other substances (com.)

On March 21st.—991 to 1001.—J. Howard. Self-acting apparatus for regulating the supply of water, and disinfectant for flushing and disinfecting waterclosets.—E. Tyzack. Securing the handles of table cutlery and other similar articles.—W. Lockwood. Valves for regulating the pressure of steam, air, water, or other fluid. —J. Reading. Connecting ornaments to collar and other studs, solitaires, and other dress fastenings and articles of jewellery.—W. Wilkinson. Construction of the hood or guard for the drum mouth of thrashing machines, and fencing or shielding the same.—E. Waterman. Construction of press, applicable to the stamping out or embossing of leather, and textile and other materials.—J. J. Hutinet. Hand-boring machines.—D. Payne. Printing machines.—W. R. Lake. Machinery for dressing or cutting, shaping, and finishing stone (com.)—J. G. Tongue. Book-sewing machines (com.)—H. Hackin. Apparatus for cooling liquids.

On March 23rd.—1002 to 1013.—A. Smith. Purifying water and preventing incrustation in steam boilers.—H. A. Bonneville. Battle telemeter (com.)—H. A. Bonneville. Apparatus for ascertaining and registering the distance which railroad and other carriages have travelled (com.)—J. Kaye and J. Kaye. Collecting and checking the money received in or on public conveyances and other places.—R. Milburn and H. Jackson. Steam generators and fire grates of steam generator and some other furnaces, applicable in part to water-heating apparatus.—G. A. Danet and X. C. E. Feuillant. Preserving animal and vegetable matters. (Complete specification.)—V. Lutschaunig. Steering-power of screw steamers, named the "screw rudder."—E. Morewood and J. H. Rogers. Tinning or coating sheets of iron or other metal.—E. Giampietro. Artificial tympanum.—P. J. Hendrix. Process of preserving lamps, cans, and holders containing petroleum or any other explosive liquid or gas from the possibility of exploding.—W. H. Chesebrough. Treating hydrocarbon oils and products (com.)—E. Tyer. Electric telegraph apparatus for train signalling on railways.

On March 24th.—1014 to 1027.—B. F. Stevens. Apparatus for facilitating the transport of casks and other articles (com.)—J. Kilpatrick. Constructions of gasaliers and reflectors, which latter are also applicable to other lights and gas jets.—W. W. Fyfe. Hydraulic rams.—J. Atkinson. Apparatus for stopping and regulating the flow of air, gases, or liquids through elastic pipes.—H. A. Done. Glove-fasteners.—A. M. Clark. Preparing grain for manufacture into flour (com.) (Complete specification.)—T. C. Kermode. Torch or flambeau for signalling on board ship and for other purposes.—G. H. Ellis. Boot-cleaning machine, part of such machine being applicable for other purposes.—W. Storer. Machinery and apparatus for washing scouring, wringing, and mangling.—R. B. Sanson. Machinery for cutting cloth and other materials.—J. Evans. Machinery to be employed in bending or turning up the strips or skelps of metal to be made into tubes.—W. N. Dack. Engines worked by steam and other elastic fluids.—C. V. Walker. Electrical train describer for indicating on a distant dial the names of trains, applicable also for other purposes.—P. G. Pout. Regulating and measuring the flow and discharge of water or other liquids for preventing waste thereof, applicable to waterclosets and other purposes.

On March 25th.—1028 to 1053.—W. Smeaton. Lavatories, baths, and urinals.—G. G. Rhodes. Railway brake, chiefly designed to be used for preventing collisions and other accidents.—H. Hathaway. Construction of furnaces, and the means of supplying air thereto.—C. B. S. Webb. Cask filling apparatus.—W. Radeke. Manufacture of peat, the method of drying and charring it, and structures and appliances to be employed for such purposes, being partly also applicable to the manufacture of artificial fuel. —S. Buckley. Check pick bracket in looms for weaving.—J. S. Clarke. Appliances for audibly indicating the removal from their ordinary stands of bottles and vessels containing poisonous substances.—W. S. Sedgwick. Automatic railway-waggon and carriage coupling.—W. Holland. Stretcher joints for umbrellas and parasols.—J. W. Clayton. Manufacture of waterproof paper, and apparatus therefor.—J. G. Willans. Manufacture of iron and steel, and ingots therefrom.—A. Van Waeyenberch. Distributing steam, and obtaining variable expansion through the agency of governors in steam-engines.—R. D. Napier. Friction meter. —A. W. Ledingham. Cleaning gas retorts, and apparatus therefor.—G. Davies and W. Lees. Fringing fabrics, and the construction of apparatus therefor, part of which improvements is applicable also to the manufacture of fringe, and part to ordinary sewing machines.—C. T. Colebrook. Pump valves.—J. Robertshaw. Looms for weaving.—A. C. Lewis. Furnaces for melting steel.—J. Wadsworth. Fire-lighters.—F. Weldon. Measuring or ascertaining distances to inaccessible and other objects.—A. M. Clark. Sewing leather (com.) —A. M. Clark. Artificial butter (com.)—W. M. Hall. Sealing letters and other enclosures.—E. A. Kirby. Manufacture of lozenges or troches, and the preservation in this form of animal and vegetable juices and extracts for nutritive, medicinal, and other purposes.—P. Jensen. Manufacture of gas (com.)—P. M. Parsons. Manufacture of steel or malleable iron and apparatus therefor.

On March 26th.—1054 to 1064.—G. Haseltine. Sheep shears (com.)—T. A. Nield. Taps or valves, adapted for use in controlling the flow or discharge of steam and other hot fluids.—J. Bradbury. Steam generators and arrangements in connection therewith.—P. C. Evans. Apparatus to be employed in connection with condensing, carding, and scribbling engines for preparing or treating wool and other like textile materials.—S. R. Krom. Machinery and apparatus for crushing ore and for separating crushed ores and analagous fine and granular material of different specific gravities. (Complete specification.)—J. C. Ramsden. Method or process of and apparatus for smelting, refining, melting, converting, or purifying iron and other mineral or metallic substances.—G. Raggett. Flower and plant cases fitted for windows and other suitable openings in buildings, termed illuminated miniature conservatives.—M. H. Brown. Disinfecting and deodorizing apparatus for water-closets, and other purposes.—P. Jensen. Buffer and coupling apparatus of railway-carriages, trucks, and other rolling stock (com.)—Y. J. Murrow. Manufacture of waterproof plates or panels applicable for sheathing and roofing, and manufacture of packing and other cases, tanks, hollow spheres, cylinders, and such like from paper or other ligneous tissues prepared with cupro-ammonium. (Complete specification.)—R. C. Rapier. Locks for securing switches and for securing railway gates, turntables, bridges, and such like.

On March 27th.—1065 to 1077.—J. C. Peacock. Apparatus for heating, lighting, ventilating, and cooking.—J. Keith. Manufacture of illuminating gas and the apparatus employed therefor. —T. Simpson. Construction of kitcheners or other similar apparatus, and the application thereto of parts designed for the purpose of economizing fuel whilst cooking, heating, or boiling water.—W. R. Lake. Machinery for cutting paper, and for the manufacture of paper-twine (com.)—F. A. T. de Beauregard. Packing of stuffing-boxes and pipe-joints.—J. Dawber. Arrangements and combinations of hollow fire bars, hollow bridges, and boxes, to be used for heating the feed water of steam boilers. —J. F. Clarke. Pneumatic signalling apparatus for use in buildings.—P. Jensen. Modes of and means for producing and utilizing gas and heat (com.)—S. G. Rhodes. Apparatus for gasing and reeling yarns.—H. A. Dufrené. Process for treating madder for obtaining and separating alizarine and purpurine therefrom (com.)—J. Chedgey. Apparatus for casting tubes and cylinders in glass, for annealing glass tubes and cylinders, and also for casing or fitting such articles to protect them from injury.—J. Larue. Umbrellas and parasols.—B. P. Stockman and J. Bennett. Lamps for railway carriages and other purposes, and the method of arranging and using glass prisms in connection therewith.

On March 28th.—078 to 1094.—E. de Zuccato. Producing fac-simile copies of writings, drawings, and delineations. (Complete specification.)—F. D. Nuttall. Regenerative and other gas furnaces.—R. H. Reeves. Construction of ventilators. H. Winter.—Harnessing horses to vehicles.—A. Mayer. Machinery for making bricks, tiles, and other similar articles.—T. Hillcoat and W. Montgomery. Steam-boiler and other furnaces.—J. Harrison. Means for signalling on railways.—J. Wood. Kitchen ranges, fire-grates, and other stoves.—M. Benson. Cushioning the piston and working the valve of direct-acting steam engines (com.) (Complete specification).—P. Pieri. Breech-loading fire-arms.—A. Howatson. Method of economizing fuel in steam boilers and the means employed therefor.—J. H. Johnson. Apparatus for preventing or removing incrustations in steam boilers (com.)—J. B. Fenby. Vessels or apparatus for the infusion of coffee and for other like purposes.—G. Turton. Railway buffers.—G. Smith. Apparatus for consuming smoke.—R. L. Hattersley and T. Hebden. Means or apparatus for moulding and casting metals.—A. Warner. Manufacture of iron and apparatus employed therein.

On March 30th.—1095 to 1110.—C. F. Whitworth. Locks and latches and parts connected therewith.—W. A. Lyttle. Preparation and use of peat and peat charcoal for smelting and other purposes.—R. H. Crickmer. Motion indicators and governors for regulating and showing the number of revolutions per minute of marine and other steam engines and machinery whose parts have rotary and reciprocating motion.—M. Baerlein. Preparing yarn for weaving, and apparatus for drying yarn or cloth.—W. E. Gedge. Level (com.)—W. Meadows. Upright log and deal saw frames.—C. Eskrett. Means or apparatus employed in the manufacture of seed or oil cakes.—T. Halford and F. Bloomer. Apparatus for working railway signals.—W. P. Thompson. Furnaces and apparatus connected therewith.—J. Imray. Preparation of peat for fuel or charcoal, and apparatus therefor (com.)—J. Dewar. Ships' berths and arrangement of same; also mess tables, seats, and similar appliances connected therewith, and economizing space for cargo and other purposes on board ship.—G. A. C. Bremme. Valve gear or motion for steam and other motive power engines and steam pumps.—B. Barnard. Tables. —E. A. Cowper. Process and apparatus for clearing and smoothing spun-silk, yarn, and other threads.—G. Haseltine. Looms for weaving narrow fabrics (com.) (Complete specification).—A. M. Clarke. Apparatus to be applied to carriages for stopping or restraining horses (com.)

On March 31st.—1111 to 1132.—H. Geyler. Instrument to be used for obtaining fac-simile copies of letters and other manuscripts.—J. Plummer. Steam-boiler and other furnaces.—A. L. Dennison. Watches, clocks, chronometers, and other timekeepers.—J. Hinks and J. Hinks. Lamps for burning paraffin oil and other volatile liquid hydrocarbons.—D. Jones. Consuming or preventing smoke.—A. Haigh and J. H. Barratt. Taps and cocks.—J. N. Nuttall and J. Taylor. Railway chairs.—C. Smith and A. Alexander. Steam boilers.—W. Boulton. Machinery or apparatus to be used in the working or manufacture of potter's clay or other plastic material.—W. Sumner and D. Watson. Tubes for boilers and other purposes. —W. Darlow. Trusses, splints, and other surgical appliances employed for affording support to the human body or limbs.—J. Dodge and T. E. Coles. Furnace bars, and in the mode of mounting or setting furnace bars.—T. Redmayne. Kitchen ranges.—F. Wirth. Photographical portrait apparatus and other optical instruments (com.)—J. J. F. Stevens. Frames and disposition of levers in apparatus for working and locking railway points and signals —J. Willoughby, W. A. Southwell, T. J Briggs, and S. Willoughby. Arrangement of pans or vessels, and of apparatus for heating the same.—W. Webling. Clasp or fastening for bracelets, watches, or other articles.—W. R. Lake. Ploughs (com.)—G. Haseltine Diamond millstone dressing machines (com.) (Complete specification).—J. Denton. Method of treating animal charcoal for the purpose of re-burning or revivifying it.—D. A. Halket. Indicators for indicating the speed of revolving axles.—M. Henry. Manufacture of sugar (com.)

(*Continued on page* 105.)

Scientific and Literary Review,

AND RECORD OF PROGRESS IN

ARTS, INDUSTRY, AND MANUFACTURES,

INCORPORATING THE

JOURNAL OF THE INVENTORS' INSTITUTE.

JULY 1, 1874.

THE PATENT LAW REFORM MOVEMENT.

As the Patent Laws and Laws of Copyright are to us matters of primary importance, we consider we cannot do better than keep our readers well informed as to the state of them, and especially the former of these, for the latter receives so much attention from all the public journals, that we feel we need do little more than wish the cause of copyright amendment good speed. We therefore now devote our first page to detailing the steps recently taken to gain the attention of the Government to the present state of the Patent Laws, and the necessity for their amendment.

Early in the present year the Inventors' Institute made application to Mr. Gladstone, the Prime Minister, soliciting him to receive a deputation to explain the views of its members and other inventors on the subject; but, owing to the resignation of his Ministry, and the dissolution of Parliament taking place about the same time that this application was made, nothing resulted from it. However, soon after the advent to power of Mr. Disraeli, letters were written to him and the Lord Chancellor, respectfully asking that nothing should be done with regard to the Patent Laws until the Council of the Inventors' Institute had had an opportunity of advising with the great body of its members and inventors generally, in order to be able to state exactly what were the points in which patent law now required amendment. Directly upon making this last-mentioned application, the Council addressed a circular to all the members of the Institute (which we then published), desiring to know their views on the several points that have been found to be those constituting the subject to be dealt with. They also invited the members to conferences on the matter, all which, with full accounts of the results, we recently chronicled.

To give practical effect to these consultations, Mr. Campin, the Secretary of the Inventors' Institute, in pursuance of directions given him, addressed the following letter to Mr. Disraeli, and others to similar effect to the present Chancellor of the Exchequer and the Lord Chancellor, Lord Cairns:—

To the Right Honourable B. Disraeli, P.C., M.P. (First Lord of the Treasury):—

Inventors' Institute, June 4, 1874.

Sir,—Soon after the formation of the Government which you preside over I thereto made an application asking, as this Institute was considering the question of the amendment of the Patent Laws, that the Government would be kind enough to afford it an opportunity of placing before them the views of its members thereon, after the matter had been fully considered by them. As this has now been done I am directed to respectfully solicit you to receive a deputation to explain the nature of the amendments in the Patent Laws which are considered as urgently required, especially as regardsthe reduction of the stamp duty on Patents, and in doing so I may mention that these Laws have (since any legislative action thereon has taken place) been the subject of reports by a Royal Commission and a Committee of the House of Commons, many of the recommendations of which we approve of.

As from communications with the late Government we have been at a loss to ascertain what particular member of the Ministry we ought to address, we have, as well as yourself, addressed the Lord Chancellor and the Chancellor of the Exchequer.

I have enclosed a printed list of members of the Council of this Institute, with statement of objects, and I ought, perhaps, to mention that, in consequence of its being considered that the Patent Laws affect the artizan classes (many of whom are inventors), this Institute has been co-operating with them, and that some representatives of those classes would attend the deputation.

From the great majority of the members of this Institute being located far away from London, I would ask that any appointment should give a few days for notifying them of it, and remain your obedient servant,

F. W. Campin, Secretary.

To the letter to the Chancellor of the Exchequer the following answer was received:—

11, Downing Street, Whitehall,
June 6, 1874.

Sir,—With reference to your letter of 4th inst., in which you ask the Chancellor of the Exchequer to receive a deputation on the subject of the amendment of the Patent Laws, I am directed by Sir Stafford to say that he fears it would be of little use for him to receive a deputation on the subject, as his attention has never been directed to it, and he would suggest that the matter is more within the province of the Lord Chancellor, who is one of the Commissioners of Patents.—I am, Sir, your obedient servant,

John A. Kempe.

To F. W. Campin, Esq.

The Lord Chancellor (Lord Cairns) answered as follows:—

House of Lords, 6th June, 1874.

Sir,—I am directed by the Lord Chancellor to acknowledge the receipt of your letter of the 4th inst., asking on behalf of the Inventors' Institute for an opportunity of placing the views of that body and of inventors generally on the subject of the amendments in the Patent Laws before her Majesty's Government.

The Lord Chancellor desires me, in reply, to inform you that owing to the lateness of the period in the session at which we have arrived, and the immense pressure of the business which has to be got through during the portion of it which still remains, it will not be possible to legislate upon the subject of the Patent Laws until next year, and his lordship therefore thinks that there being, under these circumstances, no immediate hurry for the consideration of your proposals, it would be desirable to postpone placing them before him until a later period in the year, when the Lord Chancellor would have more leisure to entertain them in a manner satisfactory to your association and to himself.—I am, Sir, your obedient servant,

Henry P. Graham, Principal Secretary.

F. W. Campin, Esq., Secretary Inventors' Institute.

Reply from the Right Honourable B. Disraeli:—

10, Downing Street, Whitehall,
16th June, 1874.

Sir,—Mr. Disraeli desires me to acknowledge the receipt of your letter of the 4th inst. requesting that he will receive a deputation to explain the nature of the amendments required by the members of the Inventors' Institute to be made in the Patent Laws, especially as regards the reduction of stamp duties on Patents.

Mr. Disraeli, however, desires me to express to you his regret that the very great pressure of business prevents him from having the honour of receiving a deputation, but that if the views entertained by the Institute are addressed to him fully in writing he will be happy to give the subject his attentive consideration.—I am, Sir, your obedient servant,

Charles Baillie Hamilton.

Thus it will be seen that the Government does not refuse to entertain the question, but puts it off to a more convenient season.

Reviews.

GUIDE TO HOUSE OWNERS.

"The House-Owner's Estimator; or, What will it Cost to Build, Alter, or Repair?" A price-book adapted to the use of unprofessional people, as well as for the Architectural Surveyor and Builder." By JAMES D. SIMON, A.R.I.B.A., Architect and Surveyor. Edited and revised by FRANCIS T. W. MILLER, Surveyor, with numerous illustrations. London: Lockwood and Co., Stationers' Hall-court, Ludgate-hill, 1874.

THIS is a very useful work for all who are interested in house property, whether in a large or small way, for by it they will be enabled to form a good idea of the money required to be spent over the most ordinary alterations, additions, and repairs, and can then count the cost before incurring it. Moreover, the work is not without promise of usefulness to the architectural surveyor, as it may be used to aid him in making rough estimates for the guidance of the notions of his clients in regard to any proposed new work. Although we have spoken of alterations and additions, yet it must be thoroughly well understood that the work is just as useful in regard to the erection of new buildings, for estimates are given for such erections.

We consider this will be found a very reliable work, as in all cases the prices appear to be fully up to the average, and we would just hint that, without resorting to that abominable being, the "scamping builder," probably anyone "about to build" would find that he could get the work done for a trifle less if he took the trouble to proceed in an economical manner. However, this is as it should be, for the competition amongst builders will always render promises of cheap work easily to be had; whilst the proper market price is difficult to discover, looking at the discordant aspect of the demands of the high-priced builder and the low-priced scamper.

The work also contains some useful practical legal information as to the position of landlords and tenants, the nature of the usual covenants in leases, and so forth. In fact, the only point in which the book seems to be open to improvement is the absence of direction and advice on that fruitful source of "difficulties" in building operations, the breaking of contracts, so as to turn contract work into work at ordinary prices. It might be observed that this is a posthumous work on the part of Mr. Simon. Unfortunately he departed this life before publication; hence, Mr Miller's services were called in. Perhaps the reader is advantaged by this. We have, to a certain extent, obtained the results of the knowledge of two competent men instead of one.

MAUNDER'S TREASURY OF NATURAL HISTORY.

"The Treasury of Natural History; or, a Popular Dictionary of Zoology." By SAMUEL MAUNDER, Author of the Treasury of Knowledge," "The Scientific and Literary Treasury," &c. Revised and corrected, with an extra supplement, by E. W. H. HOLDSWORTH, F.L.S., F.Z.S., &c; embellished with more than 900 woodcuts expressly engraved for this work. New Edition. Longmans, Green, and Co. 1874.

THE present volume is a new edition of a well-known and popular work, and when we use the latter term, we do not mean to convey that it is a work suitable only for those who wish to become smatterers in this branch of science, for the information contained in this book, although necessarily restricted to generalities rather than details, and affording, as it does, specific information in ordinary language, with the least possible use of scientific terms, is nevertheless a complete scientific compendium of Natural History, adapted for popular use in a form available for ready reference, though it is, at the same time, a handy book for refreshing the memory of the scientific man.

SEA WATER FOR LONDON.

"Sea Water for London: a Scheme for Carrying Sea Water from the Coast Direct to the Metropolis." By CHARLES FREDERICK FULLER, C.E. London: Charing Cross Publishing Company, Limited, 5, Friar street, Broadway, E.C. 1874.

THIS pamphlet advocates the construction of a brick sewer way by the side of the London, Brighton, and South Coast Company's line to a convenient spot near the London terminus, were baths, on a large scale, would be erected on the principle of Brill's Baths at Brighton. This admirable establishment, says the author, I may mention, consists of extensive swimming and private baths, billiard rooms, &c., on a most liberal scale, and it is not too much to say that one of the greatest luxuries one can enjoy is a hot sea bath at Brill's. I shall, then, adopt this establishment as my guide, in discussing the possibility of forming a similar one in London.

In the first place, then, it would be necessary to construct a pumping station at Brighton, as closely as possible to the sea. An engine would pump water into supply tanks, and from thence it would find its way to the main, through which it would be conveyed to London, and again find its way into storage tanks for use.

By the process of steam pumping, a constant supply of sea water would be always at hand, and the inhabitants of this great metropolis supplied with a genuine sea bath at home. The diagram shows the course proposed to be taken, the red lines representing the main. The direction shown, is as nearly as possible that of the London, Brighton, and South Coast Railway. I have calculated that about 270,000 gallons of water would be consumed per day, supplying two large swimming baths, and, say, twenty private baths. An engine of thirty-horse power (nominal) would be sufficient to raise this and to pump in into the storage tanks. These tanks would be of iron, and would require to hold, between them, about 100,000 gallons of water. They would be fixed in a pumping-house, in as close proximity with the sea as possible. This pumping establishment would not require to be a very extensive affair, as it would only comprise the tank houses, engine room, and engine-driver's cottage.

The water main from thence would be constructed of brick-work in cement, on a foundation of concrete. This would be laid at a depth of three or four feet from the surface of ground. In crossing bridges, &c., the main would be carried on girders, built into the abutments of the bridge. The establishment in London would consist of a building on a large scale, consisting of swimming and private baths, dressing rooms, &c., and it would also be an interesting feature to add billiard and reading rooms, coffee rooms, &c., in short, an establishment long wanted in London, that only requires a few enterprising individuals to embark their energies in such a channel to set it going at once.

The machinery department in London would consist of large storage-tanks (into which the water would find its way from the main). These would ensure a fresh supply of salt water to the swimming baths daily, and would be amply sufficient for the private baths, should the demand be ever so great. An engine of about twenty-horse power (nominal) would be ample for this establishment.

Now, the cost of raising water by means of steam pumping, say a height of twenty feet, is about twopence per thousand gallons. The price being the maximum, it would, most probably, cost very much less. I have gone carefully into the various difficulties to be mastered, the amount of labour involved, together with the cost of carrying out the scheme, and I have come to the conclusion that the total cost would not exceed £500,000.

The brick main would cost the least of any method. Cast-iron pipes could also be employed; but the cost would be very much more, and they would also be very much impaired by the action of the salt water. It would probably be found necessary, however, to use cast-iron pipes in certain places. For instance, where the main would pass over a viaduct, and there is not sufficient depth to allow of the foundation for the water-way, then probably the best plan to adopt would be to carry the water through cast pipes while crossing the viaduct, and again convey it to the main.

There are several difficulties to be got over in this great undertaking, but none that are insurmountable; and I firmly believe that should the suggestion ever be attempted, success will attend the venture. It would in reality be only a matter of cost, and the modest sum I have named cannot, I feel sure, be deemed too large an outlay for a scheme at once so noble and so healthful.

It would undoubtedly be a boon to the people, and more particularly to the faculty. The author afterwards refers to a plan for bringing here sea water from Shoeburyness, which, in some respects, he considers even better than that above described.

FOOD ADULTERATION.

"Adulterations of Food, with Short Processes for their Detection." By ROWLAND J. ATCHERLEY, Ph.D., F.C.S. W. Isbister and Co.

THIS is a very useful little book, appearing at a time when the subject of adulteration is of so much importance. Dr. Atcherley has supplied a want much felt at the present day. His book contains practical tests, as well as a carefully compiled description of volumetric solutions; equally useful to the consumer, the dealer, and the professional chemist. The tests for the adulteration of butter, coffee, beer, and tea appear good. We are, however, disappointed at the little notice taken of an article so largely adulterated as vinegar; it is now impossible to procure a sample of pure malt vinegar; what is now sold is made solely from acetic and sulphuric acids; of the latter the Legislature permits 1 to 1,000 by weight. The majority of grocers now make their own white vinegar; the acetic acid in its pure state is supplied to them by the manufacturers, after which it is diluted to the required strength with water. Dr. Atcherley states that he has examined several samples of corn flour, and that he has found them to "consist of corn flour only in its pure and unadulterated form." We cannot reconcile this with the evidence given by Dr. Bartlett before the Select Committee, viz., that all corn flour is adulterated, and that caustic soda is used to destroy the nitrogenous portions of the flour; this may be done in this country, but we know that the Oswego corn flour manufactured at New York is fermented alone with pure water.

Some analysts state that spirits are little adulterated, especially whisky. Now, there is no article more adulterated than whisky. Let any analyst go to some public house in one of our leading and less fashionable thoroughfares—it is here where adulteration is rife—and take the poison that is supplied to him from the counter to be drunk on the premises—for it is well known that the whisky or spirits of any kind that a publican supplies in this manner is a very different article to that which he allows to leave his premises—and he would meet with an adulteration that would surprise him, especially of methylated spirit. Dr. Atcherley states that this adulteration is difficult to discover, except by the practical man:—"He rubs a few drops of the liquid on the palms of his hands, and, applying them loosely to his face, inspires the air through his fingers. By this means the aroma of the spirit is fully brought out, and the "twang" of the wood-naphtha easily recognized."

We congratulate Dr. Atcherley on the publication of this book, and recommend it to all who desire to gain some useful information, in a practical and condensed form, respecting the adulteration and analysis of food.

ANCHORS FOR THE ROYAL NAVY.

"The Admiralty Anchor Scandal." By JOHN TROTMAN. London: Hutchings and Crowsley, Printers, 39 and 41, Henry-street, St. John's Wood. 1874.

MR. TROTMAN, in this pamphlet, comes boldly forward to denounce the conduct of the Admiralty in the matter of his anchor, and everybody who knows anything about the treatment of inventors by Government Departments will read his statements with a readiness to believe in their truth and soundness. We cannot go through all these, though they are well worthy of perusal by all inventors, especially those whose ingenuity leads them to devise improvements for use by Government Departments. The following passage will, we think, give the reader a general view of the strength of Mr. Trotman's case:—

The Admiralty, in fact, prove too much. If the Trotman anchor has the serious and fatal defect imputed to it, why is the safety of the most sacred and illustrious life in these Islands entrusted to it? If the "professional adviser" instructs Mr. Goschen to say that the Trotman anchor "cannot be depended upon for biting and holding when first let go," how can he reconcile it to his loyalty and duty to the Sovereign to allow it to be used on board the royal yacht? What uneasy, restless nights the "professional adviser" must have whenever her Majesty or the Heir Apparent is at sea? "Here we have in our dockyards" (we may suppose him to say to himself) "a Navy anchor which always bites and never drags, and yet I have allowed the Queen and Royal Family to go to sea solely dependent upon a Trotman's anchor, which I know, of my own knowledge, and which all the officers of the Royal Navy declare cannot be relied upon for biting or taking hold at the critical moment." What miserable nights such a First Sea Lord must have passed. We should almost think that he has ill discharged his duty in not going down to Portsmouth whenever her Majesty returns from Antwerp, Ireland, or Cherbourg, and ordering the Trotman anchor to be put bodily on shore out of harm's way. "Oh! I have had such an uneasy time since you have been away," we can imagine him saying to the captain of the royal yacht. "How did your anchor behave?" We know what Admiral Denman's answer would have been, because we have his evidence upon the Trotman anchor. Reproduced textually, and only put into colloquial form, his reply would have been: —"Don't make yourself uneasy, Admiral. Trotman's anchor always bites and holds perfectly. It has never failed me in any way. It is vastly superior to your Admiralty anchor in every respect, and if you transfer me to-morrow to the largest of our line-of-battle ships, I should, for many reasons, be most anxious to have Trotman's anchor. I really cannot understand, Admiral, why the Admiralty have not more readily supplied these light and most efficient anchors to the Navy." If the "professional adviser" had betaken himself to Captain Crispin or Captain His Serene Highness the Prince Leiningen, G.C.B., who together have been answerable for the safety of the royal yacht for nearly twenty years, he would have heard similar testimonies to its unfailing efficiency.

If any catastrophe occurred to the life most precious to Englishmen through any default of the anchor on board the royal yacht, we know quite well how eagerly the First Lord of the Admiralty and his First Sea Lord would excuse themselves. "We gave her Majesty (they would say) the protection of the very best anchor which modern science has produced—an anchor which, after the most rigid comparative tests, conducted by the very best committee which England could produce, was unanimously declared to be the best and most trustworthy in the world." The Admiralty would be thereupon excused and acquitted before any Court of Inquiry in the world, except for the evidence supplied by their own prejudice and inconsistency. What answer could they make to the inquiry? "Why, then, have you not supplied this anchor to the Royal Navy?"

The irrationality of the Admiralty is indeed an affront to common sense. The Trotman anchor has secured for twenty years the safety of the royal yacht *Victoria and Albert*, of 2,345 tons, and if it be not the best anchor that can be had for a ship of that size, somebody's head ought to be brought to the block on Tower Hill. Assuming that it is the best anchor, why have not the Admiralty ordered it to be supplied to every ship of and below that tonnage in the Royal Navy? The First Lord one day, and the Secretary to the Admiralty another, tell the House of Commons that although the Trotman anchor may be good for a yacht, it may not be best for a man-of-war or line-of-battle ship. Would it not be supposed that the Admiralty, after supplying it to all vessels of and under 2,345 tons, would make tentative experiments by supplying it to ships of larger tonnage, and directing it to be tested comparatively with the Navy anchor? If for a period of fourteen years it has never yet failed on board the *Great Eastern*, of 23,000 tons, is there not *primâ facie* reason to believe that its action would be equally and always certain "both as to biting instantaneously and holding most tenaciously" the largest iron-clad ship afloat, say of 5,000, 6,000, or 7,000 tons? It is, however, an insult to the understanding of my readers to argue this question seriously. It is on the one side a question of logic, common sense, and economy; on the other of mere official or personal prejudice on the part of the "professional adviser" to the First Lord of the Admiralty. I can not only appeal to some 20 years' experience of the Trotman anchor at sea in the royal yacht, but to the accumulated experience gained by the use of upwards of 60,000 other Trotman anchors, all of which are, more or less, in daily use in every quarter of the globe, on board the well-found yacht, the *Great Eastern* steam-ship, and whole fleets of truly magnificent ships belonging to all the great shipping companies of the world, such as the Cunard Service, the North German Lloyds, &c., &c.

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"THE MARBLE ARCH."—We have received two monthly numbers of this promising addition to our periodical literature. Amongst the contents we note a very suggestive article comparing the writings of Dickens and Thackeray; and in its original column, biographical column, (which is filled by a life of Handel), its historical column literary column, educational and scientific column, musical review column, and obituary column, much interesting reading will be found. A noteworthy feature is the distribution with this work of a piece of music by Handel, usual folio size, in a handsome wrapper, and published apart from the magazine. The work emanates from the Ladies' Printing Press, 48, Hunter-street, W.C.

NEW READING GLASS.—Mr. Lewis Jackson has recently registered a design for a new reading glass, which enables a whole line or several whole lines of print to be read without movement of the glass.

SMEATON'S COMBINED HEATING AND FIRE EXTINGUISHING APPARATUS.

THIS invention consists in certain combinations and arrangements of apparatus whereby supplies of hot and cold water to houses and other buildings can be brought into operation simultaneously, and rendered available for the extinction of fire, a larger quantity of water being thus obtained and with greater certainty in any case of sudden emergency than by any of the arrangements hitherto in use.

Hot and cold water reservoirs are respectively fixed in the most elevated available part of the house or other structure, or, if desired, they may respectively be placed at different levels. The hot water reservoir is supplied with heated water by means of main pipes from a boiler in which the water is heated by a furnace or other suitable means, as well understood. Tubes are connected with the main pipes, by means of which the heated water may be conveyed to any desired part or parts of the house or building, and so employed for heating purposes, as well understood. The cold water reservoir is supplied with water from the street main. The cold and hot water reservoirs are respectively connected by means of a pipe or pipes furnished with a self-acting double action valve or valves for the purpose of allowing the whole of the water contained in the respective reservoirs, which are thus combined, to be made available at any moment, the valve or valves opening or closing according to the pressure exerted thereon by the body of water in either reservoir, and thus allowing it to descend through the respective pipes connected therewith, and which are respectively carried through the several parts of the building. Hydrants or branches to hydrants, provided with suitable cocks, to which hose can be attached, are connected with the tubes at any desired points, and from which a supply of water can be at once obtained, in case of a fire occurring. A self-acting double action valve is provided in connection with the heating apparatus, by which the cold water from the street main is prevented from passing into the same, but allowing the heated water to pass into the cold water pipes, and so to be available for the hydrants, as before mentioned. In immediate connection with the street main is a self-acting double action valve, by which the whole of the water in the reservoirs and pipes is retained therein, in the event of the supply from the street main ceasing, or the pressure thereof being reduced below that exerted by the column of water between the last mentioned valve and the reservoirs. Vertical hot water main pipes from the boiler are connected with a safety expansion box in proximity to the hot water reservoir and a self-acting double action valve is placed in proximity to the cold water reservoir (which is also provided with a ball cock) by which the supply and exhaust of cold water thereto is regulated.

In the case of an excess of pressure from the street main over that derived from the column of water in the reservoir, the whole force of the supply from the street main can be made available without interfering with the hot water apparatus. It is also manifest that the hot water alone may be employed independently of the cold water supply.

The reservoirs may be respectively duplicated or used in any desired number, and the respective valves are of such sizes and forms as are necessary or expedient for the purpose or purposes for which they are to be employed.

In some cases, such chemical substances as are capable when brought into a gaseous or vapourized state of extinguishing fire, are placed in the hot water reservoir, and are thus most usefully employed, but even when such substances are not so employed, the steam and vapour resulting from the use of heated water materially assists in the effectual working of the apparatus.

It will be manifest that the apparatus which forms the subject of this invention is greatly superior in point of efficiency, power, and certainty of action to any methods hitherto employed for the like purpose, it being applicable to every description of building, and it should be mentioned that an important feature in connection with it is, that it can be readily added and adapted to apparatus already erected for the supply of hot and cold water.

The proprietors are J. G. Smeaton and Co., heating, ventilating, and hydraulic engineers, patentees and manufacturers, Harwood-road, Fulham, London, S.W.

COCOA AND ITS MIXTURES.

The discovery of cocoa by Columbus, at Trinidad, in the year 1498, was an important era in the manufactures of this country; probably no article of food and drink has monopolized a greater share of industry as a staple manufacture.

The great botanist, Linnæus, who was very fond of a drink made from its seeds, named it *Theobroma Cacao*, and deemed it as a "food fit for the gods."

There are several growths of Cocoa, all indigenous to the tropics, but the finest comes from Trinidad; the West India Islands supplying the chief importation to this country. It would be difficult to conceive a more charming sight than the cocoa gardens at Trinidad when in full bloom. Any one who has seen our rich apple orchards in Kent at the early stage of blossom, to which they may be likened, can form but a slight comparison. These luxurious flowers of rich pink and saffron colours, resting, as it were, on the bright-green foliage of the leaves, and shaded by the tall majestic palm trees, form a picture which can be witnessed only in a tropical clime. The average height of the trees is thirty feet, the wood is porous, and the bark of a light brown colour. The flowers being much too numerous are considerably decimated as they arrive at maturity, the more hardy ones only yielding fruit; a single pod of which yields a large number of seeds. In planting the trees great care is necessary in the selection of soil, which must be rich and well irrigated. The trees rarely produce fruit until the fifth year, and are not matured until the eighth or tenth, when they yield a plentiful crop. There are several methods of drying the seeds after taken from the pod, but they are generally placed upon mats made from the *Cocos nucifera* (cocoa-nut tree), and left to dry in the sun. These mats, which generate much electricity, soon render the cocoa fit for exportation.

Cocoa, as an article of food and drink, cannot be too highly appreciated; in nutritive power as a nitrogenous and carbonaceous food it has no parallel. It combines, indeed, in a concentrated form, all the essential elements for the support of the human body. The following shows the average analysis*:—

Fat (cocoa butter), 50·00; albumen, fibrine, gluten, 19·00; starch, gum, 18·00; water, 5·00; theobromine, 2·00; salts, 4·00; colouring matter, 2·00; total, 100·00.

The manufacture of cocoa in Europe was first commenced by the Spaniards early in the fifteenth century. It is difficult to determine when it was first introduced into this country, but there is no doubt, through England being the mart of the world, that Columbus was the first to introduce native manufactured cocoa here. It is a fallacy to suppose, as many do, that the Spaniards were the first to manufacture the nut or seed, from its virgin state into the form of paste. The earliest records we have of the Island of Trinidad, is, that the natives there were in the habit of grinding the nut, or seed, between stones, and afterwards adding sugar and spice until it became a paste. This crude practice is followed to this day in its primitive state.

Dr. Sloane (afterwards Sir Hans Slcane) is said to have first made known the method of manufacture in England. But when mechanical appliance was first brought to bear upon his knowledge is doubtful. To Mr. Dunn, of the firm of Messrs. Dunn and Hewitt, whose factory still stands on Pentonville-hill, we are indebted for having converted cocoa into such a nutritious article of food and drink. After a long series of experiments, he succeeded in producing a substance in the form of a paste, from which have arisen the various cocoas and chocolates of the present day.

Whether the manufacture of cocoa to a soluble state with arrowroot, improves it as an article of diet, is doubtful; it is certain that dyspeptic persons find the fatty substance difficult to digest, whilst, when utilized with starchy matter, it may be generally used, and is brought within the reach of all. When, however, taken in this state, it should be *always first boiled*. Of the varieties of cocoa manufactured by Messrs. Dunn and Hewitt, the "Iceland Moss" claims the best attention. The nutritious properties of the moss are well known, and when combined with such an article as cocoa, it forms a delicious dietary drink.

At present there appears to be little cocoa sold in its pure state, some manufacturers are, however, pushing it into the market, and it meets with an increasing sale. Of this, a very excellent article is manufactured by Messrs. Cadbury Bros., which combines all the properties of the cocoa nut in a condensed form, and is much recommended by the faculty. Of Continental cocoas introduced here as pure, we have Van Houten's; this is prepared almost to an impalpable powder, which makes it easily soluble; by this means the full aroma and strength of the nut is brought out. It is rich in cocoa butter, and makes a light and nutritious article of drink.

The consumption of cocoa is rapidly increasing; during the past year, the Custom House received duty on no less than 8,311,032 pounds. These figures alone should be sufficient to prove the virtue of an article, the most wholesome of all beverages.

H. W. PENDRED'S ELASTIC SCREW PROPELLER SHAFTS AND THRUST BLOCKS.

At the meeting of the Inventors' Institute, on May 28, Mr. H. W. Pendred, C.E., read his paper on the subject above-named, in which, after some very interesting remarks on the general question of the desirability of elasticity in propeller shafts, and improved construction of thrust blocks, he proceeded as follows:—

I come now to that portion of my paper which is the most difficult, because it is the part dealing with a device of my own. I will endeavour, however, to be as brief—consistently with putting my application of a principle as clearly as may be—as I can. I must also beg to impress upon all now present, and who have heard me thus far with patience, that I do not claim for my invention—if, indeed, invention it can be called—anything more than that it is a step in that direction in which we ought to travel in the future of screw steam navigation. We should have an elastic, a really flexible propeller, flexible in each portion of each blade, as well as that flexibility in the shaft which will allow the propeller, while actuated by the engines, to have a certain amount of independent action, such as will free it from the great strains caused by the momentum of the reciprocating parts of the engines in board, such strains being at present often exerted at the worst possible moment—when the screw is perhaps drowned in the roll of a wave. The latter flexibility is that to which I now confine myself, coupling it with the kindred elasticity provided in a longitudinal direction. My reason for hoping for good results in the way of a reduction of vibration, combined with economy of power, is this: a flexible propeller blade need be only flexible in the direction of rotation and in the direction of its axis, no elasticity in the direction of its diameter is required; thus a fish is flexible longitudinally, because it can stiffen its tail or fins at pleasure, so as to increase their propelling power of action; if moving slowly, the tail is not alone urged feebly against the water, but the pitch regarding it as a propeller blade is reduced, and thus we find longitudinal elasticity; the elasticity of the tail in the direction, as I will call it, of rotation, is too familiar to need comment. Well, then, failing any present means of making a screw propeller whose blades shall resemble the true fish-tail action, I try that which, while I am conscious of its imperfection, is the next best thing. I provide two elasticities within the ship, where we can measure fairly the strains to be dealt with, and where breakage can be repaired. These elasticities provide the two which I have considered above as being necessary to obtain an approximation to the fish-tail action. At present I can only rest my hope of successful results upon theory, backed up by nature's arrangements as precedents under analogous conditions.

The mechanical arrangements whereby I secure elasticity in the two directions are very simple. I have studied to make them so as much as possible, for of course all mechanism on board a ship ought to be simplicity itself. The repair of breakages, when a ship with hundreds of persons on board is tossed like a cork on the waves of the Atlantic, must be a matter of minutes, otherwise they are likely to be too late.

The drawing and models show very plainly the principle of my invention; indeed, I do not advance the design illustrated by the sketches as the only or even the best methods of securing the two elasticities. When the invention comes to be practically applied, it is almost certain that we will find some methods of construction as well as certain degrees of elasticity give the best results, but these can only be arrived at by the tentative process of experiment.

I will proceed to refer to the models.

No. 1 illustrates the construction for large ocean steamers and war ships.

No. 2, the plan for small vessels, such as yachts, steam launches, *et hoc genus omne*.

No. 3, the plan for the repair of broken shafts at sea.

In No. 1 it will be seen that I divide the propeller shaft from the engine shaft. They are, in effect, as separate from each other as a locomotive is from the train for which it is getting up steam to draw to its destination. I call the one portion the engine shaft, the other the screw shaft. I fit the thrust blocks, as a matter of course, to the screw shaft, and it will be seen that instead of bolting them as rigidly as possible to the ship's hull, I arrange them to fit guides similar to those of a locomotive piston-rod as provided for inside cylinder engines. Lugs are cast on the thrust-blocks, and these slide in the guides. On the forward portion of the guides I fix small cylinders, within which I place helical buffer-springs, while in the after extremities of the guides I place indiarubber blocks or other elastic cushions to absorb recoil strains.

When all is at rest the springs in front bear against the buffer-rods or studs, cast with, or otherwise secured to, the lugs of the thrust-blocks, and keep the lugs pressed against the cushions, even as the springs on the draw-bars of a railway carriage keep them drawn till their shoulders rest against the frames; as soon, however, as the screw is rotated, and acts to force the ship ahead, the thrust-blocks tend to urge the vessel through the medium of the springs, and the longitudinal action of the screw is, to a certain extent, quite independent of the movements or resistances of the hull. This independence I regard as one feature promising to reduce vibration. This supplies longitudinal elasticity. I now refer to torsional elasticity. This I provide in even a simpler manner than that which I propose for the "thrust." For large vessels, as shown in No. 1, I fit a fixed disc on the screw-shaft; this disc has notches in its periphery radiating from the shaft in the centre, and they are rounded on the surfaces against which the flexible slips or blades bear, so as to give the greatest freedom of action to the latter. This disc is surrounded by a steel hoop, purposely omitted in the model to make the action of the blades more clear. On the engine-shaft I put a similar disc, but it is so fitted that it can be shifted at pleasure along the shaft, one or more feathers securing rotation with the shaft. The steel hoop of this disc has a set screw over each notch, and it will be seen that no cut or hole is made in any of the flexible blades, so that the strength of each is unimpaired, and it is simply run into place in the engine disc and secured by the set screw. The reason I make the engine disc free to be shifted, is to enable the engineer in charge to regulate the amount of torsional elasticity to suit different conditions of weather and speed. Model No. 2 does not contain any provision of this kind, as I do not think it probable that it would be much needed in little vessels, but it could be adopted if requisite. Model No. 3 represents another branch of the subject under consideration. Nos. 1 and 2 represent means proposed for the joint objects of economising engine power, and preserving shafts from fracture. No. 3 illustrates a method I propose for the repair of fractures occurring at any point, other than in or very close to the journals. As will be seen, I propose the use of a section of shaft other than circular, and putting thereon a loose sleeve of steel, which is placed on each length of shaft when the shaft is first made, if the shaft gives way the engines are stopped, the sleeve run up to cover the fracture, secured with a wedge or set screw to prevent shifting, and the shaft can once again be rotated by the engines.

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* This compares favourably with Dr. Lankester's, which is the analysis generally received.

I must now proceed to a short analysis of the practical working of the schemes, and I will return to model No. 1, and consider first the torsional action. Some practical men will probably say that the objection to the cage of flexible blades would be, that either they will break across if made light enough to give sufficient flexibility, or else no appreciable torsional flexibility will exist at all. I cannot myself think that this sort of objection has real foundation. In a sense, the blades are cantalêver springs, and from the fact of each being a single leaf-spring, and working quite independent of its fellows, no loss of flexibility takes place from the great friction ever present in large heavy springs built up of several leaves; besides this the amount of flexibility is capable of the nicest apportionment; it can be regulated both by the number of blades used, and by length of cantaliver worked between the two discs; hence I am strongly of opinion that a very great amount of torsional flexibility may be hoped for without any inherent weakness in the cage of blades. Next I turn to the thrust-block part; here I claim for the scheme a certain advantage I have not yet adverted to. I believe every practical engineer who has had to do with marine engineering knows, that the task of "centring" all the bearings of a long screw propeller shaft is no easy one; the *bete noires* of the chief engineer of a large steam ship are "hot bearings;" they are, in a sense, the destroyers of his peace of mind; his "Nemesis," which "dogs" him, sleeping or waking. Hot bearings in paddle engines, where the shaft is comparatively short in proportion to its diameter, are unfortunately but too common; the evil is of necessity increased as the length in proportion to diameter is added to, and the journals are placed further apart. The india-rubber water pipe, with its nozzle over each bearing, is the marine engineer's skeleton, perpetually reminding him of his lurking foe. As the Ashantee savage was to Sir Garnet Wolseley, so is a a hot bearing to an engineer in charge The evil of the difficulty of truly centring a long shaft on a rigid foundation is greatly enhanced on board a steam ship. A long screw steam ship is, as referred to the screw shaft, nothing other than a girder uniformly loaded while the ship is afloat in dock; if the engines are then at rest (and as a matter of course they are so when the shaft is being centred) the conditions for the erection of machinery are the same as in a land structure; but immediately the engines are set to work a certain set of cross and alternating strains are called into action in one particular part of the ship or girder, which must, in the nature of things, exercise a certain influence on the shape of the girder and consequently on the centring originally correct, or, if my audience will allow me to borrow a phrase "in tune;" these strains of the engines, being localised, too, tend in some degree to put the centring of the shaft in its bearings "out of tune," and hot bearings are the natural result. Well, in my scheme, the shaft is divided into as many separate lengths as there are cages employed, and the cages answer to universal joints, leaving each pair of bearings to themselves. Well, now, if the mere action of the engines in smooth water have a tendency to put the shaft bearings "out of tune," what may not be anticipated from the complicated strains of the waves of an Atlantic sea-way? Overworked engines, and a screw alternately threshing the sea and rotating in the air, bearings must needs be secure and the ship stiff, to keep journals "in tune" under such working conditions.

I now come to the thrust strains. Marine engineers know the trouble the crank pin bearings give them. These, like the shaft bearings, are hard to keep cool, and demand constant attention and lubrication, even when no end strains are exerted on the shaft as in paddle engines. The evil is aggravated in screw shafts as now fitted; the propeller converts the entire indicated horse power of the engines, less frictional and vibrational waste, into end strain on the shaft, which strain is or should be received by the thrust blocks and transferred to the hull of the ship. To do this effectually, however, the thrust blocks must be not merely secured to the hull between the screw and the engine cranks, but they must be positively incorporated with it. The evil effects of girder deflection under varying strains referred to as putting the shaft bearing centres "out of tune," do not practically, in my opinion, operate here, because the cross section of a steam ship, regarded as a girder, must be to all intents unyielding, owing to the extravagant excess of the depth represented by the vessel's length of the girder over the span as represented by her beam, no appreciable deflection can be possible; but the thrust blocks cannot at least with our present constructive appliances be incorporated by welding with the ship's hull; therefore, bolts and rivets are all we can rely upon, but when we consider the magnitude and constantly varying nature of the thrust strains on thrust blocks as at present fitted, it becomes obvious that the most careful and skilled workmanship, and the best materials are essential to so secure non-elastic thrust blocks as that no strain shall come on the crank pins.

Hot crank pins in screw shafts arise from either of three causes, viz., brasses set too tight, defective lubrication, or distortion of the crank pins, either from original bad workmanship, or from strains received by them from the screw which of right belongs to the propulsion of the vessel, and should be absorbed by the thrust blocks. Well, then, if my hearers will examine model No. 1, they will see that no end thrust can by possibility reach the engine cranks. The engine shaft has no relation save its legitimate one of rotation with the screw shaft, consequently at least one source of hot crank pins is eliminated from the engine room.

I now come to the final feature of my invention, the provision for repairing broken shafts at sea, even in heavy weather. A letter from Mr. Cook, the well-known tourist agent, was published about a fortnight since in the *Daily News* about the breakage of the screw shaft of the *Ethiopia* in the Atlantic, about 1,000 miles from Greenock, and how the shaft was so repaired that the vessel steamed home to Glasgow in safety. I went to Mr. Cook's office, and was courteously shown a letter of his own, describing the nature of the fracture and its repair; the fracture was obliquely across the shaft through an old flaw; the ship was fortunately in a dead calm at the time, and the chief engineer, to give occupation to his staff, set them to try and mend the broken shaft; and Mr. Cook stated that in nine days three "holes were drilled through the oblique fracture, the diameter of the shaft being 14 in.;" these holes were plugged with iron or steel pins; clamps were put outside, steam got up, and a speed of from five to seven knots an hour was maintained for the thousand mile run to Greenock. Of course, if there had been any great sea way on, there would not even have been time for the repairs, for the safety of the tremendously long ocean steamers now built depends on their having steerage way; if they lose this they are in terrible jeopardy, because they "scend" off into the trough of the sea, and if they cannot run before the wind the waves simply beat them under the water, and they founder, consequently any repairs to machinery to be effective must be done in, if possible, a few seconds, at all events in a few minutes; the seconds are best, because the ship has not lost her "way," and can be kept out of the trough of the sea; when minutes are occupied, way is lost, and the ship will get into the trough; but then "way" may be again got on her; and though it is a fearful task to get a heavily-laden steamship—whose length is perhaps ten times her beam—head to wind after she has broached round into the trough of an Atlantic sea-way, yet it may be done with skilful steering and an able captain. Consequently, if screw shafts can be repaired expeditiously and effectually, the knowledge that the means for such repair is provided will tend to cheapen insurance premiums, encourage passenger traffic, and enhance the value of screw steam navigation.

In conclusion, I must beg to remind my hearers that I do not advance my own inventions as being the best means of overcoming acknowledged evils in a great means of transport. I only claim for them that they are, so far as I know, a step in a direction never yet followed by marine engineers, and that possibly others, as well as myself, following up the matter may do much more to improve and add to the comfort, the economy, and the safety of screw steam navigation.

In the discussion on this paper (for which we cannot now find space), Mr. F. H. Varley and Mr. Furness took part, referring to some inventions of theirs for effecting similar objects to Mr. Pendred's; also Messrs. Calley, Murray, Carttar, Campin, and the Chairman After votes of thanks to Mr. Pendred. and the Chairman, the meeting terminated.

ILLUSTRATIONS OF MR. PENDRED'S INVENTION.

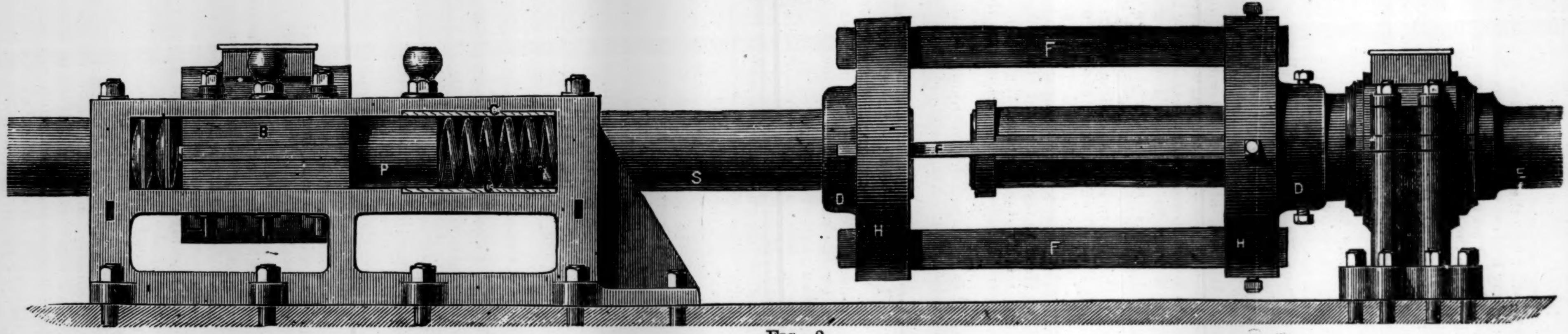

Fig. 1.

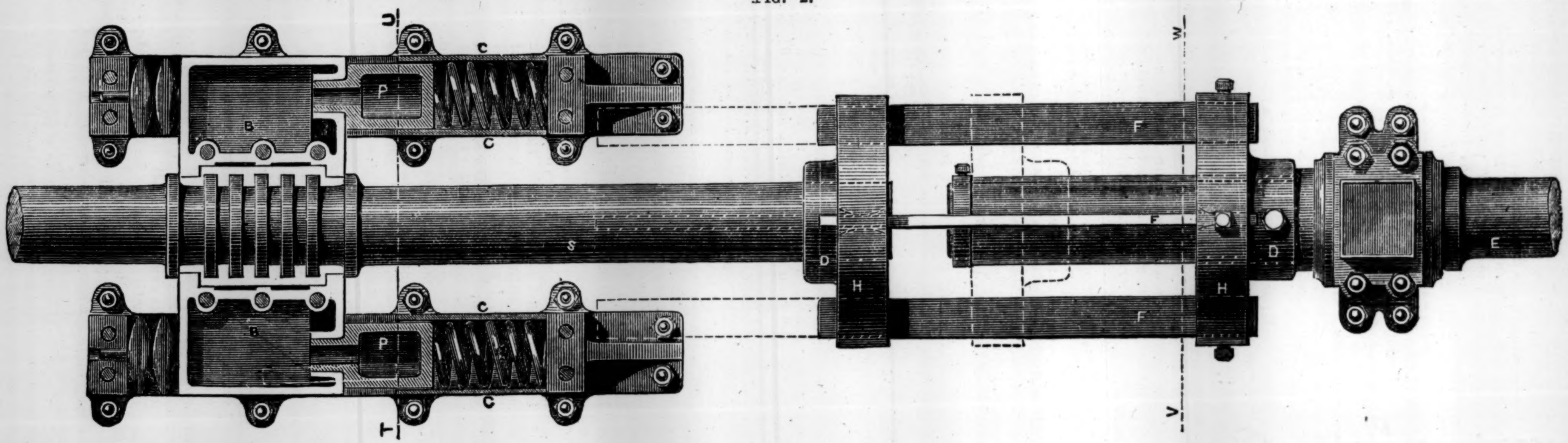

Fig. 2.

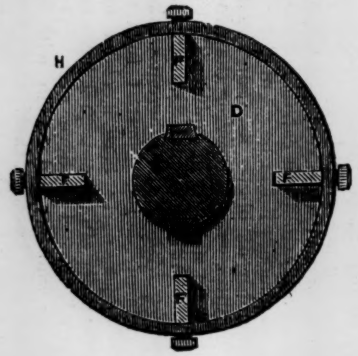

Fig. 3, Section on V W.

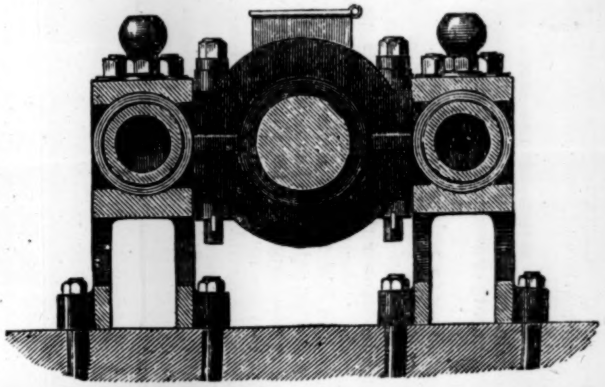

Fig. 4, Section on T U.

The Illustrations show the general arrangement of Mr. Pendred's invention. Fig. 1 is the side elevation, having the springs for the thrust blocks rendered visible by showing the cylinders enclosing them in section. Fig. 2 is the plan, which, also, has the spring cylinders in section, while the upper guide bars and upper half of the thrust block are removed to display the details more distinctly. Figs. 3 and 4 show cross sections. F F are the flexible blades placed in the discs D D, one of which can be moved up to the dotted lines; H H steel hoops which surround discs D D; E is the engine shaft; S, the screw shaft; C C are the thrust spring cylinders; B B is the thrust block and its lugs; P P are the plungers bearing against thrust springs. It is proposed by Mr. Pendred to supplement the washer recoil springs with small air cylinders and cup leather pistons. When the blade advances forwards, it draws the pistons readily with it, but on the engines being stopped, then the pistons recoil against the air as a cushion, and it can only escape slowly through a small hole in the end of each cylinder, so that all recoil shock is obviated.

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President of Council:

SIR ANTONIO BRADY.

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Council Meetings Thursdays, July 16th (monthly special) and 30th. Executive meetings at same time.

Subscriptions are payable to Mr. G. A. STRETTON, the Receiver, 4, St. Martin's-place, S.W., who is the proper official to give receipts.
F. W. CAMPIN, Sec.

Proceedings of the Institute.

AT the meeting of the Council (ordinary and special) held on 28th May, F. H. Varley, Esq., presiding, the minutes of the last meeting having been read and passed, the Secretary (Mr. F. W. Campin) stated that as this was the first meeting of the present Council, office-bearers of the Council ought now to be elected. The following elections then took place:—Sir Antonio Brady, President of the Council; Hume Williams, Esq., Barrister-at-Law, Vice-President of the Council for general meetings thereof; F. H. Varley, Esq., Vice-President of the Council for executive meetings. It was resolved that a sub-committee, consisting of Messrs. F. H. Varley, M. M. Harris, A. J. Murray, T. Morgan, C. G. Carttar, and F. W. Campin (Secretary), together with the usual *ex officios*, be, and is hereby, appointed to draft a list of twelve members (exclusive of office-bearers as *ex officio* members) of the proposed executive of the Institute, and bring up same for approval and appointment by the Council.

At the meeting of the Council (ordinary and special) held on 11th June, C. Graham Carttar, Esq., in the chair, after the minutes of the last meeting had been passed, the Secretary brought up the report of the sub-committee giving a list of names suggested for members of the proposed executive committee or executive of the Institute, namely, Sir Antonio Brady, President of the Council of the Institute; the Treasurer, the two Vice-Presidents of the Council, the Secretary, the Auditor, and Capt. J. H. Selwyn; Messrs. W. H. Barlow, H. Bessemer, H. C. Coulthard, J. Faulding, D. J. McLauchlan, T. Morgan, A. J. Murray, F. Ransome, C. W. Siemens, and W. Yates.

It was resolved unanimously that any Vice President of the Institute, or other members of the Council, be entitled to attend the meetings of the executive committee or executive of the Institute, and take part in the proceedings thereof, but not to be summoned thereto.

The Secretary read letters from Sir Stafford Northcote, Chancellor of the Exchequer, and the Lord Chancellor, Lord Cairns, with reference to the reception of a deputation of the Institute on Patent Law Amendment (see p. 95).

At the meeting of the Council on 18th June, F. H. Varley, Esq, in the chair, the minutes of last meeting having been passed, the Secretary read a letter from the Premier, the Right Honorable Benjamin Disraeli, on the subject of the proposed deputation of the Institute to wait on him to state its views on the subject of the Patent Laws After some discussion the meeting adjourned till Thursday, June 25th, at 4 o'clock p.m., to meet at the Office of the SCIENTIFIC AND LITERARY REVIEW.

The members' meeting on 11th June will be reported in our next.

Members recently admitted:—The Hon. Wyndham E. C. Stanhope, Messrs. A. Brown, M. T. Landau, Aris, Louissan, C. W. Finzel, F. J. Bird, W. Holyoake, P. H. Egerton, J. B. Hamilton, R. Roberts, C. L. Light, C.E, W. W. Box, W. L. Mitchell, Hartley, Topham, W. Wilson, G. Gale Rew.

Monthly Notices.

Macmillan's edition of White's "Selborne" is to be edited, as regards Natural History, by Mr. Frank Buckland, and Lord Selborne is to contribute a chapter on the British antiquities lately discovered there.

Rapid Decay of Iron.—The *Athenæum* states that Mr. E. W. Binney, at a meeting of the Manchester Literary and Philosophical Society, exhibited some portions of the roof of the railway station at Salford, which, after being in place four years, was so much corroded that it had to be taken down. The sulphuric acid and soot, from the combustion of coal used in the locomotives, has evidently been the cause of this. As Mr. Binney remarked, it is most desirable, seeing the extent to which iron is used in construction, that the public should be made acquainted with all the circumstances under which decomposition is produced in this metal. It is but recently that an iron ship has sunk at sea, through the action of sugar upon her iron plates, producing rapid decomposition.

The Chinese and Japanese patina bronzes have been examined by M. Henri Morin, of the Paris Conservatory, who finds that lead enters largely into the composition of these bronzes. In some specimens as much as 20 per cent. was found. These bronzes, which contained 80 parts of copper, 10 parts of lead, 4 parts of tin, and 2 parts of zinc, were found to be of close and beautiful grain; and, when heated in a muffle, it quickly takes the dark patina, which has been hitherto thought to be a varnish.

University of Edinburgh Practical Schools.—A meeting will shortly be held in London to raise subscriptions for the extension of the practical schools of the University of Edinburgh. Already £60,000 has been subscribed in Edinburgh for the purpose, but £40,000 more is required. An influential Committee has been appointed in London with Dr. Dyce Duckworth and Dr. George Birdwood as Honorary Secretaries, and the arrangements for the public meeting are being rapidly matured.

The Sanitary Record, a journal of public health, a new weekly paper to be published by Messrs. Smith, Elder, and Co., is to appear soon. It will deal with the hygiene of houses, schools, nurseries, hospitals, workshops, mines, &c. It will be under the editorship of Mr. Ernest Hart.

The Social Science Congress in Glasgow has been definitely fixed for the 30th September; Lord Moncrieff to be President of the Jurisprudence Section, Lords Ardmillan and Gifford assisting him. Mr. Frederick Hill is to preside over that on the Repression of Crime, now a question for consideration.

A College for Science and Literature is proposed to be established, with a view to providing for the special requirements of the West of England and South Wales. Its principal purpose will be to give advanced instruction to those who are anxious to continue their studies after the usual school age. Two Oxford Colleges, Balliol and New, have resolved to contribute the weight of their influence and name, and subscribe £300 a year each for five years, merely stipulating that the claims of liberal education of all kinds be duly considered, and that they themselves share in the management. Bristol has been indicated as the site for such a college, and the authorities of the local museum, and of the Bristol library, which has lately been united with it, have expressed a willingness to associate the proposed college with their institution. Another local source of strength is the promised co-operation of the British Medical School, the faculty of which, having formed the design of erecting new buildings, are ready to unite in a joint undertaking.

A Conversazione of the Anthropological Institute is arranged for Wednesday evening, July 1, at the Bethnal Green Museum, when an address will be delivered by Col. Lane Fox, illustrative of the loan collection of weapons he has liberally placed there. The museum will be lighted up, and ladies will on this occasion be invited.

Mr. G. Smith's Travels in Assyria and operations at the mounds of Kouyunjik are to be brought before the Society of Biblical Archæology, on the 7th of July, at their rooms in Conduit-street.

University Library, Cambridge, will be closed from June 24 to July 7, both days included.

Antonio Maschio, the Dante commentator and gondolier, whose critical labours have been published under the auspices of Prof. Alberto Errera, has lately given three lectures on the "Divina Comedia," at the Teatro delle Loggie of Florence, dressed in the characteristic costume of his profession—*Athenæum.*

Jeremiah Horrox and the Transit of Venus.—The first observer of this transit, it is now thought, should have a memorial in Westminster Abbey.

Temperature of the Water in the Atlantic.—The Government Scientific Expedition has, amongst other things, proved that on the western side of the Atlantic, at all the stations south of the Bermuda and Azores line, the bottom water is colder than that on the east side, which shows that the Antartic cold current enters the North Atlantic, runs to the north-westward through the channels between St. Paul's rocks and the Brazilian coast and gradually expends itself as it circles round to the north-eastwards, in the same manner as the warm equatorial current does on the surface, considering that current as including the Gulf Stream, which it undoubtedly helps to produce. This cold current entering the North Atlantic is found between 1,700 fathoms and the bottom, a total thickness of 700 fathoms. The heat-giving properties of the equatorial and north-east trade current, carrying as they do a continuous body of warmed water towards the Caribbean Sea, can be traced by the rise in temperature of the whole body of water at Sombrero, and afterwards at all the stations in the North Atlantic, but most readily so by the widening of the isotherms about 62 degrees, between America and Azores. Thus is formed an immense reservoir of warmed water, 1,000 feet thick, and at least two millions of square miles in extent. This change of temperature or disturbance is greater, and nearer the surface on the western side of the Atlantic, the nearest point to the source of the current, than at the eastern side, where it slowly and gradually expends itself. The most remarkable fall of temperature due to depth has been found at a station 180 miles south of Cape de Verde Islands, at the south edge of the trade wind, the temperature at 50 fathoms being 54·2 degrees, when the surface was 78 degrees, a fall of 24 degrees.

Prof. G. Forbes, who, as deputy chief of the Sandwich Islands party, is to take charge of the observations at Owhyhee, is now on his voyage. The principal Egyptian station will be at Cairo, and there is a probability that the transit will also be observed at, or near the site of, ancient Thebes.

The French Association for the Advancement of the Sciences is to hold its third meeting this year at Lille, the session commencing on the 20th, and closing on the 27th, of August.

Ancient Egyptian Blue.—The Egyptians appear to have been acquainted with the preparation of three distinct kinds of blue pigment, prepared from mixtures of sand, soda, and lime, with oxide of copper. One of these fine colours has been lately examined by M. Henri de Fontenay, who contributes a paper on the subject to the June number of the *Annales de Chimie.* The author publishes not only analyses of ancient specimens, but recipes for their imitation. A mixture of 70 parts of white sand, 25 of chalk, 15 of oxide of copper, and 6 of dry carbonate of soda, yielded, when fritted together, a blue material said to be equal in colour, texture, and durability to the ancient examples.

The New Shakspere Society. — The *Academy* says that the New Shakspere Society at the present time numbers 401 members.

Proceedings of Societies.

ROYAL SOCIETY.

MAY 21ST.—W. Spottiswoode, Treasurer and V.P., in the chair.—The following papers were read: "On the Structure and Development of *Peripatus Capensis*," by Mr. H. N. Moseley.—"The Uniform Wave of Oscillation: an Analysis," by Mr. J. Imray, —"Some further Experiments on the Transmission of Sound," by Dr. Tyndall,—"On some recent Experiments with a Fireman's Respirator," by Dr. Tyndall,—and "On Combinations of Colour by Means of Polarised Light," by Mr. W. Spottiswoode.

June 4th.—J. D. Hooker, President, in the chair.—The annual meeting, for election of Fellows, was held. The following were elected:—I. L. Bell, W. T. Blanford, H. B. Brady, T. L. Brunton, M.D., Prof. W. K. Clifford, A. W. Franks, Prof. O. Henrici, Ph.D., P. G. Hewett, J. E. Howard, Sir H. S. Maine, LL.D., E. J. Mills, Rev. S. J. Perry, H. W. Rumsey, M.D., A. R. C. Selwyn, and Major C. W. Wilson.

June 11th.—The President in the chair.—The following papers were read:—"Preliminary Note on the Absorption of great Thicknesses of Metallic and Metalloidal Vapours," by Mr. J. N. Lockyer; "Note on the Absorption Spectra of Potassium and Sodium at Low Temperatures," by Prof. Roscoe and Mr. A. Schuster; "Note on the alleged Existence of Remains of a Lemming in Cave-Deposits of England," by Prof. Owen; "On the alleged Expansion in Volume of various Substances in passing by Refrigeration from the State of Liquid Fusion to that of Solidification," by Mr. R. Mallet; and "Note on the Excitation of the Surface of the Cerebral Hemispheres by Induced Currents," by Dr. B. Sanderson.

ANTHROPOLOGICAL INSTITUTE.

MAY 12TH.—Prof. Busk, President, in the chair.—Messrs. J. E. Spratt and W. G. Thorpe were elected Members. Messrs. Garrard and Co. exhibited a collection of gold objects from Ashanti. Mr. F. Galton gave some results of school statistics which he had obtained from Marlborough and Liverpool Colleges. A paper, also by Mr. Galton, was read, "On the excess of Female Population in the West Indies." The author had made use of, and embodied the results in the paper, a mass of statistics that had been furnished by the Colonial Office. A paper, by the Rev. H. W. Watson, was read, "On the Probability of the Extinction of Families," with prefatory remarks, by Mr. F. Galton. The author remarked that it is not only the families of eminent men, or of the aristocracy, who tend to perish, but also those of municipal notabilities and others whose names were once common and familiar, but have since become scarce, or have wholly disappeared. The conclusion drawn was, that an element of degradation must be inseparably connected with one of amelioration, and that our race is necessarily maintained chiefly through the "proletariat." The problem, which was one purely for the mathematician, was to ascertain what proportion of specified families will necessarily become extinct after a few generations. It would be easy then to measure the diminution of fertility by the frequency of extinction. Major Godwin-Austen contributed a paper "On the Rude Stone Monuments of the Nágás."

May 25th.—Prof. Busk in the chair.—Mr. G. M. Atkinson was elected a Member.—The paper read was by Mr. Hyde Clarke, "On Researches in Prehistoric and Protohistoric Comparative Philology, Mythology, and Archæology, in connexion with the Origin of Culture in America, and its Propagation by the Sumerian or Accad Families." It dealt with the relations of language to culture, as cultural philology. A sketch was given of the succession or chronology of languages, the earliest places being assigned
to the pygmean and cannibal races, and t
distribution of the various classes in Ameri
Africa, and India, being dealt with.
one class were assigned the Darib, Whyda
and Aino, languages of Honduras were c
pared to West Africa, and the Khend to t
Wolof. The Agaw languages were treat
as having been introduced into Sou
America as Guarani, Omagua, &c., and d
placed by the more civilized Sumerian
Peru. Proceeding to consider the origi
the early languages, the laws of format
of animal and weapon names, and of neg
tive words, were illustrated. With rega
to the epoch of the monument-buildi
peoples, affinities of language were sho
among these; and Mr. Clark proposed
employ Sumerian for the class, and Acc
for the single language. Starting, probab
from High Asia, one branch passed as Acc
to Babylonia, and another to India a
Indo-China, including Pegu and Cambo
(Kemer). Thence traversing the Pacific
Easter Island, and following the Agaw
migration passed into America, foundi
the Aymara domination in Peru, and t
of the Maya in Yucatan. A second w
probably supplied the Georgian and Etr
can in the West, the Siamese, &c., in In
China, the Quichua (Cissii ?) in Peru,
the Aztek in Mexico. Comparisons
grammar were given of the newly-de
phered Accad (cuneiform) with the Qui
and the Georgian. The author conside
that tradition indicated an ancient kno
ledge in Western Asia, afterwards obscur
of the intercourse with America and Aust
lia.—Mr. P. Harrison, Col. L. Fox, Con
Hutchinson, Dr. Leitner, and others, t
part in the discussion.

JUNE 9TH.—Prof. Busk, President, in
chair.—Dr. W. S. Church was elected
member. Sir J. Lubbock, Bart., rea
paper "On the Discovery of Stone Imp
ments in Egypt." The author began w
a sketch of the writings and opinions of
Arcelin and Dr. Hamy, who maintained t
the flint implements found along the val
of the Nile, including a hatchet of the
Acheul type at Deir el-Bahari, indicated
existence formerly of a true stone age th
as in Western Europe. M. Mortillet
Dr. Broca concurred in that view. On
other hand, Dr. P. Bey, and especially
Lepsius, had expressed the opinion t
most of the objects described, such as
flint flakes, were naturally produced.
Chabas also took the same view as
Lepsius, and denied the existence of
evidence of a stone age either in Egypt
elsewhere. On the occasion of a late v
to Egypt with the object of getting conc
sive personal evidence on the question,
author found worked flints at various sp
along the Nile valley, especially in
valley of the tombs of the Kings at The
and at Abydos, and after carefully weigh
the facts and arguments brought forw
by MM. Lepsius and Chabas, he was
posed to agree with MM. Arcelin and Ha
in considering that these flint impleme
really belonged to the stone age, and w
ante-Pharaonic. Sir John exhibited a
series of the Egyptian flint impleme
found by himself during his visit, and
paper concluded with a minute descript
of each specimen. Prof. Owen read a pa
"On the Ethnology of Egypt." Since
observations recorded in 1861 by Pru
Bey, on the race-characters of the anci
Egyptians, mainly based on the charact
of skulls, evidences in the author's opi
of a more instructive kind have been
covered, chiefly by Mariette-Bey. T
consist of portrait sculptures mostly, stat
found in tombs, accompanied by hierog
phic inscriptions, revealing the name, c
dition, and date of decease. A study
those works led to the conclusion that th
distinct types were indicated; first,
Primal Egyptian type, with no trace eit
of negro or Arab; secondly, the type of

conquering shepherd kings, or Syro-Arabians, which is exemplified in the Assyrian sculptures; thirdly, the Nubian-Egyptian. In conclusion, the Professor drew a graphic picture of the high state of civilization attained by the ancient Egyptian race, whose exquisite works, done six thousand years ago, were amply illustrated by a series of photographs, maps, and diagrams. Mr. E. Schuyler communicated a paper "On the Batchas of Central Asia."

GEOLOGICAL SOCIETY.

MAY 13TH.—J. Evans, Esq., President, in the chair.—Messrs. A. Browning and L. Rhys were elected fellows; and Dr. T. C. Winkler, of Haarlem, and Dr. J. S. Newberry, of Washington, Foreign Correspondents of the Society. The following communications were read: "Note on some of the Generic Modifications of the Plesiosaurian Pectoral Girdle," and "*Murænosaurus Leedsii* (Seeley), a Plesiosaurian from the Oxford Clay," Part I., by Mr. H. G. Seeley,—and "On the Remains of Labyrinthodonta from the Keuper Sandstone of Warwick, preserved in the Warwick Museum," by Mr. L. C. Miall.

BRITISH ARCHÆOLOGICAL ASSOCIATION.

MAY 13TH.—Annual General Meeting.—J. R. Planché, Esq., V.P., in the chair.—The Balance Sheet having been read and approved, the Meeting proceded to the ballot of Officers and Council for the year, when the following list was adopted:—President, K. D. Hodgson, M.P.; Vice-Presidents, The Earl of Effingham, Sir J. G. Wilkinson, H. Syer Cuming, J. Evans, G. Godwin, R. N. Phillips, J. R. Planché, Rev. Prebendary Scarth, Rev. W. S. Simpson, and T. Wright; Treasurer, T. Morgan; Secretaries, E. Levien and E. Roberts; Secretary for Foreign Correspondence, T. Wright; Palæographer, W. De Grey Birch; Curator and Librarian, G. R. Wright; Draughtsman, G. F. Teniswood; Council, G. Ade, T. Blashill, W. Bragge, C. Brent, G. E. Cockayne, W. H. Cope, R. H. Fisher, J. H. Foley, A. Goldsmid, J. W. Grover, H. W. Henfrey, Rev. S. M. Mayhew, G. G. Adams, J. S. Phené, J. W. Previté, and S. I. Tucker; Auditors, E. P. L. Brock and F. A. Waite.

MATHEMATICAL SOCIETY.

MAY 14TH.—Dr. Hirst, President, in the chair.—Mr. L. Hammond was elected a Member; the Rev. A. J. Stevens and Mr. W. Ritchie were proposed for election.—The papers read were, "On the Correlation of two Planes," by the President,—"The Contact of Quadrics with other Surfaces," by Mr. W. Spottiswoode.—A paper, by Mr. L. H. Röhrs, "On a Rotating Sphere filled with Viscous Fluid," was taken as read.—Dr. Hirst, Mr. Spottiswoode, and Prof. Clifford took part in the discussions on the papers.

June 11th.—Dr. Hirst, President, in the chair.—The Rev. A. J. Stevens and Mr. W. Ritchie were elected members: Dr. J. Casey was proposed for election, and Mr. G. S. Carr was admitted into the society.—The President, before vacating the chair, informed the meeting that Lord Rayleigh (a member of the council of the society) had expressed his intention, in a letter, of presenting to the society the sum of £1,000, to be invested, and the interest applied to assist in the publication of the proceedings, and also in the purchase of Mathematical periodicals.—Prof. Cayley having taken the chair, the following papers were read: "On the parallels of Developables, and of Curves of Double Curvature," by Mr. S. Roberts; "Note on the Numerical Calculation of the Roots of Fluctuating Functions," by Lord Rayleigh; "On a Remarkable Relation between the Difference of Two Fagnanian Arcs of an Ellipse of Eccentricity e, and that of two Corresponding Arcs of a Hyperbola of Eccentricity $\frac{1}{e}$," by Mr. J. Griffiths; "Stability of a Dynamical System, with Two Independent Motions;" and "On Rocking Stones" and "Small Oscillations to any Degree of Approximation," by Mr. E. J. Routh.

ZOOLOGICAL SOCIETY.

MAY 19TH.—Dr. E. Hamilton, V.P., in the chair.—Mr. Sclater exhibited a skin of the new Japanese stork (*Ciconia Boyciana*), and read an extract from a letter from M. Taczanowski, relating to its occurrence in the Amoor territory. Letters were read from Dr. W. Peters, relating to the locality of *Poriodogaster Grayi*, and from Doctor Hector containing a correction to his article on Cnemiornis, published in the Society's proceedings. Prof. Newton exhibited and remarked on two original letters, the property of Dr. J. B. Wilmot, written from Mauritius in 1628, and referring to the Dodo. Letters and communications were read from Mr. G. E. Dobson, on some experiments made on the respiration of certain species of Indian freshwater fishes,—from Mr. W. H. Hudson, on the habits of the burrowing owl (*Pholeoptynx cunicularia*) of the pampas of Buenos Ayres,—from Mr. C. W. M'Intosh, on "Contributions to our knowledge of the British Annelida;" and another containing the portion of an account of the Annelida collected during to *Porcupine* Expeditions of 1869 and 1870,—from Dr. J. E. Gray, on the species of feline animals (Felidæ),—from Dr. Gray, on a new species of cat, from Sarawak, proposed to be called *Felis Badia*,,—and from M. L. Taczanowski, entitled, "Déscription d'une Nouvelle Espéce de Mustela du Pérou Central."

June 2nd.—Arthur Grote, Esq., F.Z.S., in the chair.—The Secretary read a report on the additions that had been made to the Society's menagerie during the month of May, 1874, amongst which were specially noticed a blue-faced green amazon parrot (*Chrysotis bouqueti*), a young male koodoo antelope (*Tragelaphus strepsiceros*), and a racoon-like dog (*Nyctereutes procynides*), acquired by purchase; two Pacific whimbrels (*Numenius femoralis ?*) from Quiros Island, Pacific, presented by the Rev. S. J. Whitmee, C.M.Z.S.; a Beisa antelope (*Oryx beisa*), presented by Admiral Cumming, and a Guilding's amazon (*Chrysotis guildingi*), transmitted by Mr. G. H. Hawtayne, from St. Vincent, W.I. A letter was read from Mr. T. D. Forsyth containing an account of some of the animals met with in the vicinity of Kashgar. An extract was read from a letter received from Mr. E. P. Ramsay, C.M.Z.S., relating to a living cassoway (*Casuarius australis*), which he was proposing to send to the society's collection. Professor Owen, F.R.S., read the fifth part of his series of memoirs on the "Osteology of the Marsupialia." This portion contained a general account of the osseous structure of the kangaroos. Lt. Col. H. Irby, F.Z.S., exhibited specimens of apparently a new species of raven, which he had lately obtained in the vicinity of Tangier, Morocco, and which he was intending to describe under the name of *Corvus tingitanus*. A communication was read from the Rev. O. P. Cambridge, C.M Z.S., on some new species of the Arachnidean family of *Drassides*, from various localities. A communication was read from Dr. E. Grube, containing descriptions of new annulata, collected by Mr. E. W. H. Holdsworth on the coasts of Ceylon. A communication was read from Mr. W. Nation on the habits of *Spermophila simplex*, as observed in the vicinity of Lima. A communication was read from Mr. A. G. Butler containing a list of the butterflies of Costa Rica, with descriptions of new species. The next meeting for scientific business (concluding the present session), was appointed to be held at the society's house, in Hanover-square, on the 16th of June, 1874, at half-past eight o'clock, p.m., to receive the following communications:—1.—Dr. J. Murie.—On the nature of the sacs vomited by the hornbills. 2.—Mr. W. Saville Kent.—A further communication upon certain gigantic cephalopods recently encountered off the coast of Newfoundland. 3.—Mr. A. H. Garrod, F.Z.S.—On the "Shewing off" of the Australian bustard (*Eupodotis australis*). (Received 23rd May, 1874.)

CHEMICAL SOCIETY.

MAY 21ST.—Prof. Odling, President, in the chair.—Dr. Corfield delivered his lecture "On the Sewage Question from a Chemical Point of View." The lecturer, after remarking that he was going to consider the question of the value of chemical evidence on the sanitary view of the subject, compared the various systems for treating sewage, all of which might be reduced to two classes: the first, that of conservancy, where more or less of the solid matter was retained in the neighbourhood of habitations; and the other, where the whole of the excretal matter was removed along with the foul water by means of sewers. He emphatically condemned the former as poisoning the wells in the neighbourhood and liable to give rise to disease, for it was a fact that the smallness of the death-rate at any large town was proportional to the efficiency of the means used for the removal of the sewage. He subsequently discussed the various methods of rendering sewage innocuous, showing that the only one of any value for this purpose was that of intermittent surface irrigation.

June 4th.—Prof. Odling, President, in the chair.—The following papers were read:—"Dendritic Spots in Paper," by Mr. H. Adrian. These he finds to consist of sulphide of copper formed from particles of gun-metal derived from the machinery employed in manufacturing the paper, and are far more usually found in common papers than in the better classes. "The Acidity of Normal Urine," by Mr. J. Resch. "On a simple Method of Estimating Urea in Urine," by Dr. Russell and Mr. West. The apparatus employed for this purpose was exhibited, and a practical illustration given by Mr. West. "On Ipomacic Acid," by Messrs. G. Neison and J. Bayne. This acid prepared by the action of nitric acid on jalapin, the authors find to be identical with sebacic acid. "On Certain Compounds of Albumen with the Acids," by Mr. G. S. Johnson. "On Sulphite of Acetyl," and "On a new Method of Preparing Tolciene," both by Dr. D. Tommasi. And "Note on New Zealand Kauri Gum." by Mr. M. M. P. Muir.

METEOROLOGICAL SOCIETY.

MAY 20TH.—Dr. R. J. Mann, President, in the chair.—Mr. D. G. Briggs was elected a Fellow; and the names of fourteen candidates for admission were announced. A Report was read from the council on the observation of natural periodical phenomena. The following papers were read:—"Some Remarks on the Estimation of Wind Force, and the Relation between Pressure and Velocity," by Mr. C. O. F. Cator, in which he first expressed a strong opinion on the impossibility of estimating the force of the wind with any degree of accuracy; but thought that for any useful purpose it must be obtained from instrumental observation. As to comparison of pressure and velocity, he thought that simultaneous records from the instruments and limited scales now in use are quite inconvertible; but that such a result might be practicable if an extended scale were applied to a pressure anemometer. He then referred to the different notations for describing the wind, and condemned Beaufort's (0-12) as eminently unsatisfactory, both on account of the means by which the numbers were arrived at, and especially because of the difference of standard for the lower and higher numbers. He then proceeded to account for the difference of force, as estimated, at any station from different directions, although the velocity as shown by

Robinson's cups might be the same—paltry by the position of the observer not being identical with that of the cups, and partly from the surrounding objects. He then suggested a new scale, and that, whether pressure or velocity were the basis, it should increase in arithmetical progression; and concluded by expressing his preference for the former.—"On the Weather of Thirteen Winters," by Mr. R. Strachan.—"On a New Deep-Sea and Recording Thermometer," by Messrs. H. Negretti and J. W. Zambra.—"On a New Mercurial Minimum and Maximum Thermometer," by Mr. S. G. Denton.

SOCIETY OF BIBLICAL ARCHÆOLOGY.

At the meeting on the 2nd June—S. Birch, LL.D., F.S.A., president, in the chair—the following candidates were duly elected members of the Society:—Mrs. Crosbie, Ardfert; Rev. J. M. Dalton, M.A., Marlboro' House; Robert Darbyshire, B.A., F.S.A., F.G.S.; Charles I. Hemans; Miss Margaret Henderson; John Gurney, Norwich; Mrs. Lennox, Sutton; Mrs. C. D. Marston; H. S. Mitchell; John Muir, LL.D., D.C.L., Ph.D., Edinburgh; J. Linton Palmer, M.D., F.S.A.; C. D. Purdon, Belfast; Col. J. Roxburgh. The following Papers were then read:—1. "On the Phœnician Inscription "Melitensis Quinta." By Prof. W. Wright, LL.D.—This paper reviewed the earlier readings of the inscription by the Duc de Luynes, Quatremère, Ewald, and Blau; and gave a revised text and translation, based on an examination of the stone itself. It was accompanied by a fac-simile of the stone described. 2. "On an Egyptian Calendar of Astronomical Observations of the XXth Dynasty." By P. Le Page Renouf, F.R.S.L.—This paper was a collection and a correction of the famous Calendar of Star Culminations, which had been published by MM. Champollion and Biot, the latter savant having, however, been misled by believing the papyrus to be astrological only. The text was accompanied by a full exegesis and a diagram of astral positions. 3. "On the Cylindrical Altar of Nectarhebos at Turin." By Joseph Bonomi (with two plates).—This interesting monument, which, although noticed by Orcurti, is now published for the first time, is a large cylindrical altar of black granite, finely wrought, and covered with sixty-eight vertical lines of hieroglyphics, and four vignettes, representing the Pharoah Nectarhebos of the XXXth Dynasty making offerings, and uttering adorations to the various deities of the four cardinal points. 4. "Translation of the Hieroglyphic Inscription upon the Granite Altar at Turin." By Samuel Birch, LL.B., F.S.A., President.—In this paper, the learned Egyptologist gave a literal translation of the hieroglyphic text, which showed it to be a series of Adorations to the Deities of the South, North, West, and East, mentioning the particular cities in which they were worshipped, thus adding some fresh names to the geographical lists of ancient Egypt under the Persian Dynasty. 5. "Assyrian Notes." By H. Fox Talbot, F.R.S.—(1). "The use of Papyrus among the Ancient Arcadians."—In his recent investigations as to the original meanings of some of the Assyrian roots, Mr. Fox Talbot found that the terms Nazabu Shakani, "the stem of a reed," and Nigris, "a volume," and "writings upon vegetable skin," occur among the Assyrian inscriptions published by the British, thus attesting the accuracy of the statement of Pliny, that the Papyrus was so used by the Babylonians, a fact which, till Mr. Sayce first called attention to it, had been disputed. (2). "Assyrian Books." In this paper, the following sentences were adduced to show that the Assyrian literature was not confined solely to inscriptions upon tablets of baked clay: "In the night-time bind around the sick man's head a sentence taken from a good book" (for a charm); and "care not to save the newly-written books," &c. (3). "On the amount of accuracy now sometimes attainable in Assyrian Translation."—This paper was a retrospective summary of what had been done in Assyriology for the last twenty years, showing that the very discrepancies of different translators was an evidence of their general agreement, in proof of which Mr. Talbot gave a translation in parallel columns of an Assyrian Hymn, translated in English by himself, and in French by M. F. Lenormant, which differed only in the most trivial points of idiom.

LINNEAN SOCIETY.

June 4th.—G. J. Allman, M.D., President, in the chair.—The President exhibited a number of living specimens of firefly (*Luciola Italica*) recently taken by himself in the neighbourhood of Turin, calling attention to the remarkable synchronous emission of flashes of light by numerous individuals, and pointing out that the phosphorescence is a phenomenon not of darkness merely, but of twilight or night. The following papers were read:—"Contributions to the Botany of the *Challenger* Expedition," presented by Dr. J. D. Hooker, C.B.; No. XII*a*, "*Challenger* Lichens (Cape de Verdes)," by Dr. J. Stirton; No. XVII*a*, "Letter from Mr. H. N. Moseley to Dr. Hooker, dated Cape Otway, Australia, March 16, 1874, on the Botany of Kerguelen's Land, Marion, and Heard Islands. No. XVIII., "List of hitherto unrecorded Species from Kerguelen's Land, Marion, and Heard Islands, with a Note on *Lyallia Kerguelensis*, Hook. f," by Prof. Oliver; "Synopsis of the Mosses of the Island of St. Paul," by W. Mitten (Appendix to Dr. Hooker's paper "On St. Paul's Island Plants"); "On the Restiaceæ of Thunberg's Herbarium," by Dr. M. T. Masters; and "On Napoleona Omphalocarpum, and Asteranthos," by Mr. J. Miers.

MICROSCOPICAL SOCIETY.

June 3rd.—C. Brooke, Esq., President, in the chair. A number of donations to the Society were announced, and six new Fellows were elected. Mr. Slack called attention to a slide exhibited in the room, as being a remarkable specimen of Herr Müller's technical skill in diatom mounting. The slide had photographed upon it, in an extremely beautiful and perfect manner, eighty spaces with the names of diatoms below each, and a diatom of corresponding species was mounted in every space. Mr. Slack also said that he had received specimens of silica solutions in the milky condition described by Mr. Read at the last meeting, but was himself unable to detect any particles suspended in it, though some had been detected by Dr. Anthony. Mr. C. Stewart described and figured on the board the peculiar position of the touch corpuscles in the skin of the hand; and he also exhibited and described a section of an ascidian, and explained the method of preparation. The President stated that the Society's rooms and library would be closed during the month of August.

CONVERSAZIONE BY THE PRESIDENT OF THE INSTITUTION OF CIVIL ENGINEERS.

The Conversazione given by the President of the Institution of Civil Engineers and Mrs. Harrison on Tuesday, May 19th, proved an eminently successful gathering, for the portion of the International Exhibition in which it took place was crowded with a brilliant assemblage of ladies and gentlemen, mostly, as may be expected, connected with the profession. Part of the picture gallery was open, and in this the President received his guests. The machinery department of the Exhibition was in full action, and besides those forming exhibits at the Exhibition there were models lent for the evening, some of them proving of a highly interesting and instructive character. Amongst these were self-acting brakes and automatic couplings for railway carriages, which had a fair share of attention paid to them. We noticed also Mr. Handyside's model of locomotive to overcome steep gradients, which, we presume, is in illustration of the small work published by him which we lately reviewed. We also noticed the patent locks of Mr. J. Morrison, which, by the way, are among the exhibits in the Exhibition. A model of Mr. Pendred's screw propeller shafts and thrust blocks, a paper on which subject was read by him at the last meeting of the Inventors' Institute: a model of Dr. Siemen's cable ship *Faraday* were also exhibited. There were also a number of other interesting models, and amongst them we noticed the model of Messrs. Varley and Furness' power coupling for heavy machinery, which is to be used for preventing sudden strains and shocks either upon setting machinery in motion or arresting machinery when in motion. A model of Mr. Whitehouse's electrical recorder for tram-cars and omnibuses attracted much attention.

YATES'S SAFETY LAMP.

Mr. Yates informs us that the City Gas Examiner has tested his safety lamp in its different forms, comparing same with the Davy and Clanny lamps. He gives the results in a comparative table, which we regret to be unable to present to our readers. Each lamp was trimmed so as to give its best light.

We extract the concluding portion of his report, which is as follows:—

The "all-round" Yates seems to me at present the best lamp, which, I think, is due to the much larger space round the wick, permitting a more free access for the products of combustion.

The lamp with a chimney has a tendency to return the products of combustion down into the flame, and so causes it to smoke and dirty the glass sooner.

In round numbers, the Yates lamp gives, for equal consumption of oil, twice the light of the Clanny, and four times that of the Davy.

(Signed),
Charles Heisch, F.C.S,
Professor of Chemistry in the Medical College of the Middlesex Hospital, and Superintending Gas Examiner to the Corporation of the City of London.

Mr. Yates notes with regard to the above that Yates's "chimney" lamp is No. 1 pattern with the addition of an inner funnel or chimney, and his "all round" is No. 3 pattern lamp as described in his pamphlet, and is made with a peculiarly shaped glass which intensifies the light.

SIMPLIFICATION OF ALGEBRAIC PROCESSES.

With reference to the paper on the "Division of Abgebraic Quantities by the Method of Detached Coefficients," by Mr. Edward David Hearn, published in last month's Scientific and Literary Review, and describing an extension of Homer's rule, so as to include divisors, the leading term of which is other than unity, a very useful suggestion is made by the Rev. Professor Galbraith, of Trinity College, Dublin, whose name is widely known in connection with the excellent scientific manuals of which he was joint author—Galbraith and Haughton's Manuals. He writes:—"I have just read your paper, and worked the examples you give, and a few others. I think your rule very valuable, and will teach it in future. I have only one remark to make, trifling, but yet I have found it very convenient in working, to put negative signs *over* the figure thus: $\bar{5}$, $\bar{3}$, &c. It makes the work look much neater, as yon can write the figures closer." In this case the positive signs would never, of course, be written; all figures without the negative sign over them being regarded as positive. The advantage of Professor Galbraith's suggestion will at once be seen upon comparing any given example written in the two forms.

APPLICATIONS FOR LETTERS PATENT.

(Continued from page 94.)

On April 1st.—1133 to 1142.—G. Edwards. Continuous brakes for railway trains.—G.W. Dolman and B. Benjamin. Apparatus for indicating the number of passengers using tramway cars or other vehicles, or passing into or from public buildings or other places.—F. W. Webb. Injectors.—Robert Rankin. Governor for steam engines.—E. Lee. Process for producing ornamental designs, letters, patterns, or figures on glass, metal, china, wood, and other such like surfaces, for decorative and other purposes. W. T. Culmer. Manufacture of varnish, paint, or other similar brushes.—G. Montezore. Advertisements by railway tickets and other public utility and pleasure services.—E. Hoskins and C. Harvey. Manufacture of taper and parallel tubes, single or compound.—A. Swingle, F. A. Huntington, and W. J. Miller. Breech-loading magazine fire-arms. (Complete specification).—N. Clayton and J. Shuttleworth. Portable engines.

On April 2nd.—1143 to 1161.—J. H. Carruthers and D. Rankine. Tramway carriages.—J. S. A. Ménier. War and commercial aerostatic hot air balloons.—J. Cleghorn and T. G. Paterson. Treatment and preparation of asbestos, and making various fabrics and articles therefrom. - C. Topham. Machines for washing and peeling potatoes, and peeling, reducing, or pulping other roots.—A. L. Sparkes and C. Marsh. Instrument for ascertaining and indicating any extraordinary temperature in buildings and apartments of every kind.—W. Howgate. Finishing fabrics and apparatus employed therein.—F. E. B. Beaumont. Rock or stone drilling or boring machinery.—W. M. Halbert. Colour printing of books and newspapers.—C. Herveux. Tanning and apparatus used therefor. — W. Crookes. Treatment of waste or refuse animal nitrogeneous matters for the purpose of producing fertilising substances or artificial manures.—S. Dear. Drawing and spinning machinery for flax, hemp, jute, wool, or other fibrous material.—W. T. Bury and A. Muir. Apparatus for making true the rolls of plate and sheet mills.—J. T. Martin. Manufacture of corks and apparatus employed therefor.—R. R. Cox. Chimney caps or terminals and wind guards.—R. W. P. Birch. Apparatus for flushing sewers, drains, reservoirs, and other waterways, applicable also for discharging measured quantities of water or other fluid.—O. Cullis. Railway fog signal apparatus.—W. M. Bullivant. Telegraph cables.—A. M. Clark. Culinary apparatus (com.)—J. Liddell. Brick-making machines.

On April 4th.—1162 to 1193.—G. W. Heaton. Boring tunnels, and machinery or apparatus to be employed therein.—W. H. J. Grout. Bicycles and wheels, such wheels being applicable to bicycles, carriages, and other vehicles.—J. Walker. Carriages or vehicles for the conveyance of goods and passengers on railways, and for the easy and safe transit of such carriages from any one guage of railway to another and different guage without points or stopping such carriages.—J. Hunt. Horse hay forks (com.)—N. Clayton and J. Shuttleworth. Travelling jib cranes.—J. Robinson. Street-sweeping machines.—E. Russ. Taps or cocks for liquids and ferrules for inserting taps in casks or other receptacles.—J. A. Voisin and P. Dronnier. Method of and apparatus for producing a light.—H. A. Bonneville. Brakes and coupling for railroad cars (com.) (Complete specification.)—T. Short. Apparatus for purifying sewage.—G. Bourne. Machinery for making metal tubes.—E. Jones and A. Howatson. Anti-fouling composition or paint.—G. E. Harries. Brushing-boot for horses.—E. Pearson. Water closets and taps for the same, also applicable to other purposes.—E. Pearson. Taps, cocks, or valves for adjusting or regulating the flow of liquids and gaseous fluids.—R. Ballingal. Instrument for measuring and registering the force or pressure of the wind, such instrument to be known as Ballingal's self-registering anemomete.—C. Groubman. Sewing machines.—J. H. McCarthy. Metallic tubes for locomotive, marine, and other steam-boilers.—A. Mosley. Combination of appliances connected with lace machines.—G. Warsop and H. W. Hill. Rock drill apparatus, applicable also to apparatus for dressing stone, driving piles, rivetting, and such like.—J. B. Bradshaw. Hoods for securing bales. – M. Belsham. Core tubes for boring machines.—C. W. Vosper. Sewing machines.—D. P. Wright. Arrangement for filling, and indicating when full, petroleum and other lamps.—A. V. Newton. Embroidery attachments applicable to sewing machines (com.)—A. Turner. Manufacture of elastic and non-elastic and fabrics and fringes.—W. Smith, sen., and J. Smith, Apparatus for breaking stones or other hard substances.—J. Pattison. Automatic hydraulic apparatus for working pumps and compressing air.—W. E. Gedge. Machine or apparatus for tawing or dressing skins (com.)—W. E. Gedge. Instrument or apparatus termed the "Manducator," intended for crushing and preparing food for consuumption by men and animals (com.)—L. Elie. Pulp strainer said rotary strainer.—W. E. Gedge. Apparatus or boiler with lateral receivers and heating by continuous circulation (com.)

On April 6th.—1194 to 1201.—W. Heginbothom. Door fastener, specially applicable to railway wagons.—C. Anderson. Machinery or apparatus for making paper bags.—F. Morgan. Vessels or apparatus for containing beer and other liquids.—H. Callaghan. Manufacture of benzoline and other lamps—F. Broughton and R. Stephens. Continuous action steam break.—C. Clamond. Thermo-electric piles.—G. H. Forbes. Method of utilising the foul lime of gasworks.—W. R. Lake. Steam engines (com.)

On April 7th.—1202 to 1213.—W. F. Bateman. Making spaces in condenser doffers.—D. Morris. Preservation of potatoes and apparatus connected theirwith —J. Stephenson and J. Pickup. Furnaces and fire-bars used therein.—J. Needham. Breech-loading fire-arms.—S. Holmes. Optical instruments.—S. Peters and W. Donald. Water-closets, and supply or discharge of various liquids.—G. Kearsley. Reaping and mowing machines.—J. Goss and F. Savage. Hoes, applicable for hoeing wheat and such-like crops.—F. C. Matthews. Fire-grates and stoves.—C. W. W. Thomas. Apparatus for manufacturing heating and illuminating gas.—H. W. Hayden. Machinery for rolling metal tubes or rods.—J. B. Pinnock. Wagonettes, phaetons, and other similar carriages.

On April 8th.—1214 to 1226.—C. Villin. Breech-loading fire-arms.—B. Ronald and J. Farmer. Apparatus for regulating the supply of water to water-closets and other vessels.—J. B. Brechin. Apparatus for economising fuel by increasing the heating effects obtainable from ordinary fire-places.—H. Schallehn. Furnaces for consuming smoke and economising fuel (com.)—F. Silas. Life buoy and self-lighting signal.—G. Haseltine. Producing a new article of food from milk (com.) — E. Gatwood. Cases for bufier springs.—J. Day. Thrashing machines.—R. A. Hunter. Apparatus for supplying water to steam boilers.—G. Haseltine. Water meters (com) (Complete specification).—H. Chapman. Cooking ranges. J. H. Guest. District and fire-alarm telegraphs.—E. Anduze, Machinery appropriated to pound and to triturate every kind of materials without exception, whatever their nature and their resistance.

On April 9th.—1227 to 1240.—H. W. Hammond. process of preparing a chemical conserved tobacco, free from nicotine and ammonia (com.)—T. Charlton and G. Charlton. Means for stopping or plugging up boiler or other similar tubes.—C. J. L. Leffler. Moulds for casting ingots.—H. A. Bonneville. Oiling or lubricating spinning or other spindle collars, bearings or axle, and other guides of machinery (com.) (Complete specification).—J. Clark. Mariners' compasses.—W. R. Lake. Machines for screwing the uppers to the soles and heels of boots and shoes, and for uniting belts, hose-pipes, and the like (com.)—R. H. Crisp. Arrangements for preventing injury to passengers travelling in railway carriages when collisions or other similar accidents occur.—C. J. Corbitt. Bags or other receptacles and frames for the same.—J. Pinker and T. A. Adamson. Removing and replacing the blades of screw-propellers of ships and other navigable vessels while afloat, and apparatus employed therefor.—G. W. Beynon. Apparatus for self-regulating and adjusting the wires of distant and other railway signals and for other similar purposes.—J. Gill. Pressing of bricks.—M. Zingler. Manufacture of varnish.—J. Grantham. Tramway cars.

On April 10th.—1241 to 1251.—J. Greenslade. Steam ploughing machinery, and the engines employed in working the same, part of such improvements being applicable for other purposes.—W. L. Wise. Apparatus for the germination of grain, the manufacture of malt and the drying of corn, fruits, peat, and other substances (com.)—W. R. Lake. Water meters (com.)—J. Harrison. Refrigerators and ice safes, cooling by the solution of salts, and the regeneration of the materials employed.—T. Eastman. Hair-pin.—P. Brannon. Mode of employing and combining certain materials for structural purposes. (Complete specification.)—G. T. Bousfield. Rotary engines (com.)—J. Willby. Self-acting mules.—W. G. Schoof. Lever escapement mechanism. (Complete specification.)—J. H. Cohrs. Railway couplings, and appliances connected therewith.—C. Groubman. Electric apparatus for indicating the progress of trains on railways.

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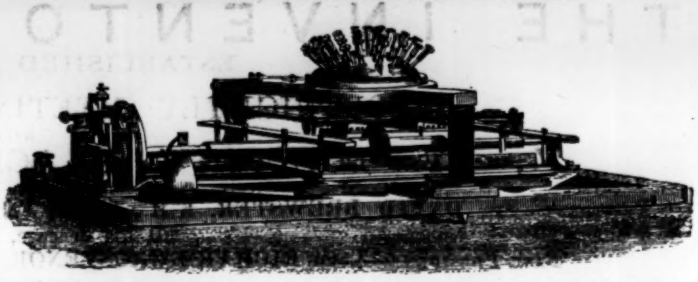

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